

MAY 1916 ~ No 125

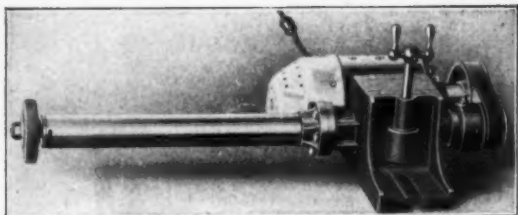
Monthly

A Reference for Buyers

HITCHCOCK'S
**MACHINE
TOOL LIST**

Distributed Free to Machine Tool
Users Everywhere in the United States and to
Dealers in American Machinery Abroad

Published by
A. H. HITCHCOCK
1220-1235 Caxton Building
Chicago



Combination Internal & External Grinder

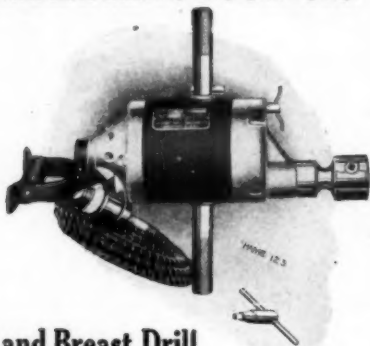
Designed for a wide range of accurate work

Smaller size machine will grind internally as small as 13-16" diameter; larger size as small as 2 1/8" diameter; depths up to 16".

Internal Grinding speeds 10,000 R. P. M.—6,000 R. P. M.;

External Grinding speeds 4,500 R. P. M.—3,000 R. P. M.;

Slower speeds with **increased power** for carrying larger internal grinding wheels can be obtained by changing size of pulley.



Hand and Breast Drill

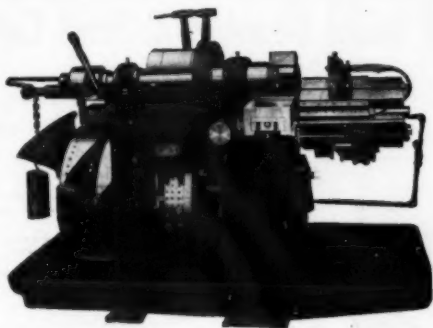
Made in five sizes. 3-16" to 1 1/2" Capacity.

Most Complete Line of Portable Electric Tools

Write for New Catalogue B

THE HISEY-WOLF MACHINE CO., Cincinnati, Ohio

New York Office, 50 Church Street



Deciding the Costs

A Vital point in deciding the cost of screw machine production is **steady output.**

Two features that insure constant production on the Gridley Single Spindle Automatic are:

Rigidity that allows higher cutting speeds, coarser feeds and heavier cuts to be used.

A Method of Tooling which allows more than one tool to be used on a slide and tools to be held firmly, close up to the work.

Are you insured against high production costs?

Send Blue Prints for estimates.

The National-Acme Mfg. Co.
Windsor, Vermont

(Successors to the Windsor Machine Company)

General Offices: Cleveland, Ohio

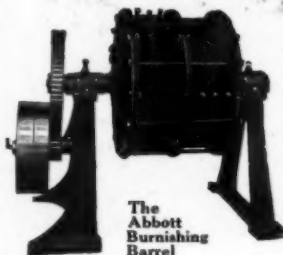
Branch Offices at

NEW YORK CHICAGO BOSTON DETROIT

With Foreign Representatives

A Bushel Burnished At Small Cost

And the Finish Greatly Improved



The
Abbott
Burnishing
Barrel

The Abbott Steel Ball Process

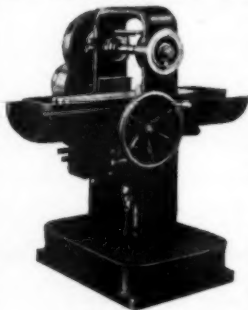
burnishes perfectly thousands of small metal parts, of the most delicate character, at the cost of finishing a few pieces by hand. Costs are reduced 75 to 99 per cent. Send for our copyrighted Book on Burnishing, and submit samples of your work.

The Abbott Ball Company

Elmwood District, Hartford, Conn.

We also make Steel Bearing Balls. Let us quote. What size?

Milling Steel Parts for Guns



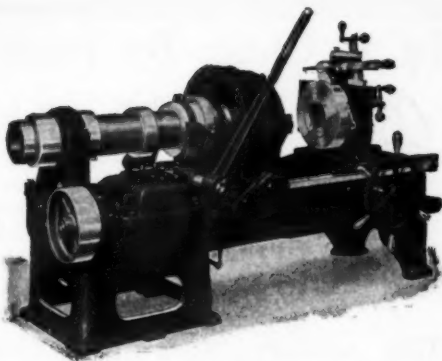
Briggs High Duty Reduces Costs

For form and gang milling of steel parts for automobiles, guns, etc., this newly designed machine does the work better and more economically. Also ideal for general use in the tool room and machine shop.

Designed by a manufacturing engineer, it embodies the features essential for rapid and accurate production, all unnecessary complications being avoided. It is a miller built for the business.

Write for details so you can judge for yourself

GOOLEY & EDLUND, Inc., Cortland, N. Y.



Machines and Service

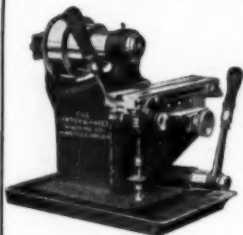
YOU WANT more than just a machine—you want service of the right kind and plenty of it. You get all that with B. & K. Pipe Cutting and Threading Machines, for they are speedy, accurate and durable.

OUR EFFORTS for over 30 years have been concentrated on these machines, and we now have a line of 17 styles and sizes for you to select from; they handle pipe from $\frac{1}{4}$ -in to 18-in. in diameter. All are fitted with the famous Peerless Adjusting Mechanism, which adjusts to the thousandth of an inch without the use of tools.

ALL ARE BUILT for, and stand up to, the severest service—you can handle them without gloves. Nipple holders do not injure threads; chuck jaws are readily sharpened without drawing temper. Write us about your requirements, and we will either serve you right or not at all.

Bignall & Keeler Machine Works
Edwardsville, Ill.

In A Class By Itself

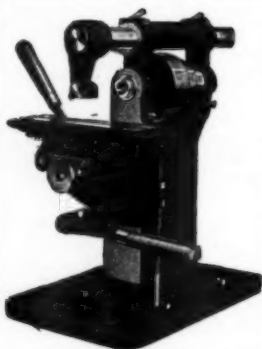


Is our New Model Bench Miller; because, we furnish with the machine our Quick operating Lever Vise, also Index Centers and two speed friction countershaft.

Send for circular

The Carter & Hakes Co. **West Winsted, Conn., U. S. A.**

AGENTS—for New England and New York, Hill, Clarke & Co.
WESTERN AGENTS—Marshall & Huschart Machinery Co.,
Chicago, St. Louis, Indianapolis.



Burke's No. 3 **Bench Millers**

Are Seasoned Tools

Our system of tests insures accuracy, and our methods of construction make it permanent. Frames and parts are carried 6 to 8 months, after work begins on them, before the completed tools receive our final O. K., and all parts are finished and fitted with exceptional care.

Longitudinal feed, 6 in.;
traverse feed, $3\frac{1}{2}$ in.; vertical
motion of knee, $8\frac{1}{2}$ in.; table
surface, $3\frac{1}{2}$ x 12 inch.

Write for Catalog, which also shows larger and smaller sizes.

The Burke Machine Tool Co. **Conneaut, Ohio**



Here's Just The Machine For You

because it will handle all
kinds of light milling jobs.

The "Whitney" Hand Miller

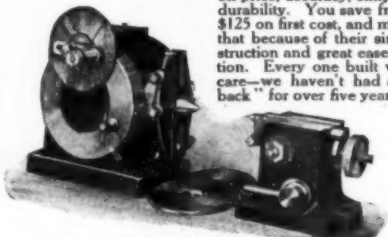
is an all around machine, well built
and inexpensive. It has features
which make it indispensable in any
machine shop. With it you can do
keyseating, profiling, straddle milling,
gear, cam and sprocket cutting, also
countless other operations.

Simply drop us a postal for details

The Whitney Mfg. Co., - Hartford, Conn.

Chains—Keys—Hand Milling Machines

Dickow's Accurate 10-Inch Universal Index Centers You Can't Beat Them



on price, accuracy, simplicity and durability. You save from \$50 to \$125 on first cost, and many times that because of their simple construction and great ease of operation. Every one built with great care—we haven't had a "come-back" for over five years.

Get the Original—Beware of Imitators

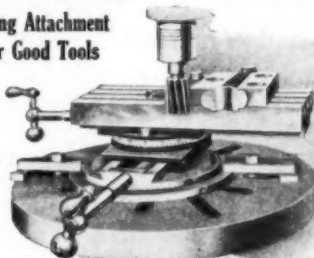
Sold by all dealers. Write today for particulars.

Fred. C. Dickow, 33-35 So. Desplains St., Chicago, Ill.

Big Conveniences At Small Cost

**Davis Milling Attachment
And Other Good Tools**

**For the
Diemaker
Patternmaker
Repair Shop
Garage, etc.**



Milling attachment shown does 90% of the lighter jobs on any drill press (14 to 42-in. swing), as well as a \$1,000 machine. Taper cuts half moon keyseats, mills deep grooves and cams. We also make cylinder reamers for reboring the Ford car. Our air compressor has ten times the cooling surface of any other. Send for Circulars.

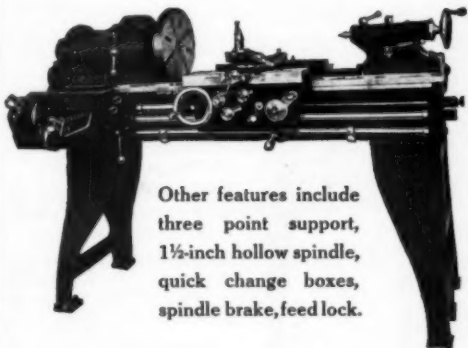
Hinckley Machine Works, HINCKLEY, ILL.

DAVIS 12-INCH CLOSE COUPLED

Tool Room Lathe has

Back Gears

built into head
with front control



Other features include
three point support,
1½-inch hollow spindle,
quick change boxes,
spindle brake, feed lock.

Send for Circular and Catalog

DAVIS MACHINE TOOL CO., Inc.
ROCHESTER, N. Y., U. S. A.

"Quickwork" Shears

For Cutting Curves in Sheet Metal

CUT ANY CURVE, circular or irregular shape, without waste of stock, and faster than five men can do the work with hand snips. The saving in material is from 10 to 40 per cent, and in labor from 75 to 90 per cent. Leaves metal flat and edges true; and makes circular or other openings without cutting in from the side. This No. 2 will cut up to 14 gauge steel; other sizes adapted to cutting thinner or thicker stock up to 4 inch. My line of sheet metal working machinery saves money for live manufacturers, because it quickens and cheapens every constructive operation.



Write For Information

It will help you to substantial economies.

H. Collier Smith, 815 Scotten Ave., Detroit, Mich.

Decide on Dalton 6" Lathes



Because in manufacturing you can shave costs by using Daltons on small parts in quantities.

Because they are built for the finest and most accurate work done in the tool room.

Because they have the strength and power for work often done on 14" to 20" lathes. They do screw cutting 3 to 144 per inch.

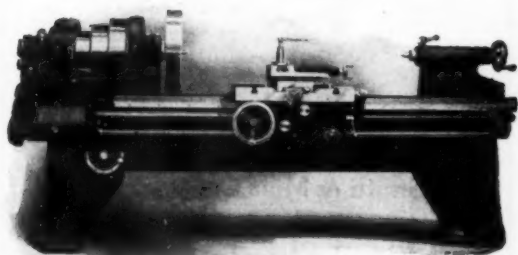
Electric drive, foot power or power driven; various mounts, for floor or bench; several attachments.

Bulletin B-600 tells more

DALTON MACHINE CO., Inc., 1910-15 Park Av. NEW YORK

WALCOTT LATHES

Made in 14, 16, 18, 20 and 25" sizes



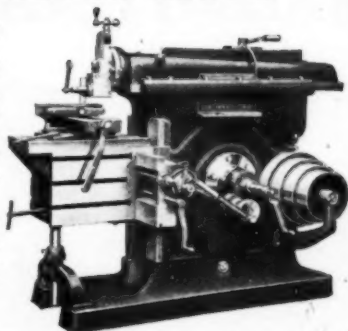
For
Tool-Room and
Factory

Walcott Lathe Co.
Jackson, Michigan

SHAPERS

12", 14", 16"
Plain Crank,
16", 20", 25"
B. G. Crank,
either Cone
Driven or
through
Speed Box.

24", 28", 32"
Geared
Shapers of
the Belt Shift
type.



The Smith & Mills Co. Station B.
Cincinnati, O., U.S.A.

Combined Shaper and Slotter

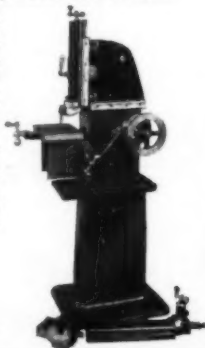
Reduces Costs on Dies, Tools and Models

While designed for small work only, the improved "Rhodes" has all the essential features of larger machines, and is saving money shaping and slotting all kinds of light work. Its exceptional efficiency recommends it to all shops—large and small.

With the Vertical Attachment as shown, it does the work of a horizontal and vertical machine—a "2 in 1" handy and profitable tool that is worth a great deal more than it costs. It covers a wide range of accurate machining.

*Send for interesting description
and our close price.*

Rhodes Mfg. Co.
Hartford, Conn.



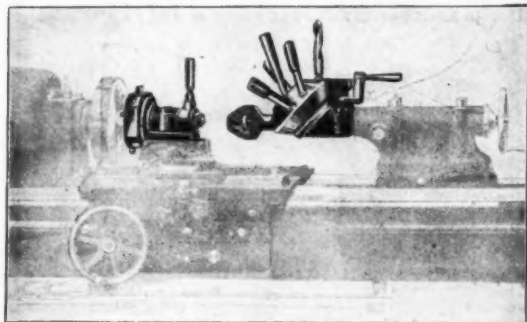
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101 F

The Newman Quick Acting Tools



Any lathe can be made into an improved turret lathe or screw machine, by attaching the two devices as shown in the above illustration on lathe patent adjustable turret tool post. The operator has four different tools at his command and requires less than a second to change from one tool to the other. With this device not only forming and cutting-off, but roughing, boring, finishing, knurling, etc., can be done.

Together with the tail stock turret there are nine tools to do the work.

Write for Circular T.

The Newman Manufacturing Co.
Cincinnati, Ohio

BRANCHES:

101 Fourth Ave., New York, N. Y. 68 W. Washington St., Chicago

Unbreakable Steel *Countershaft Hangers*



"Bantam"
For
Light Shafting

Lighter than Cast Iron
Tougher than Cast Iron
Cheaper than Cast Iron

Prompt deliveries on all
Sizes, in Several Styles

With an initial cost that is somewhat less than that of cast iron, our Unbreakable Steel Countershaft Hangers are immensely better in every way.

Being lighter, they are easier to handle and to put in place, and cost less for transportation.

Being much tougher, they do not break, either in handling or in use.

Having special ring-oiling bearings, they require the least attention in the matter of lubrication.

We solicit your orders
—or at least your inquiry
for more complete details
—because we offer you
much better hangers at a
somewhat lower cost.

*Your inquiry will have
our careful attention*

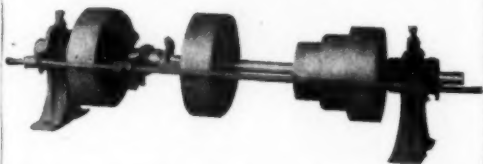
**Standard Pressed
Steel Company**
Philadelphia
U. S. A.



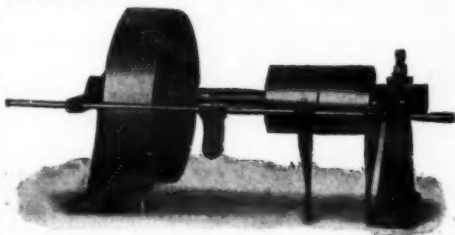
"Hallowell"
For
Medium Shafts

Countershafts

Heavy Friction Clutch



For use with rapid production Machine Tools. They stand the severest strains, being of the dependable Partridge quality throughout. Sizes: 14x4 and 14x5. Also other sizes.

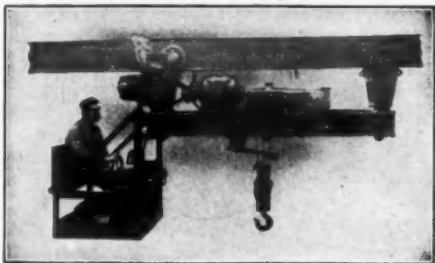


The Countershaft shown in lower cut is made in all sizes, with either plain or ring-oiling bearings.

Do you need anything in Heavy Grinders; Cabinet, Column or Bench Grinders; Foot Presses or Bench Tapping Machines; or small Turning Lathe Sets? If so, write me, as I have some exceptional values to offer you.

E. O. PARTRIDGE, 2039-2049 West Lake Street, **CHICAGO**

Mono Rail Hoists and Over Head Track Systems



A 5-ton hoist operated from cab or floor for transferring material from one building to another, unloading cars, general yard work, etc. Mono Rail Hoists and trolleys of all types.

Nothing too large or too small for our careful, prompt attention.

The Euclid Crane & Hoist Company
Euclid, Ohio

Make a Few Dollars Earn Many

Canton Cranes Pay Big Dividends

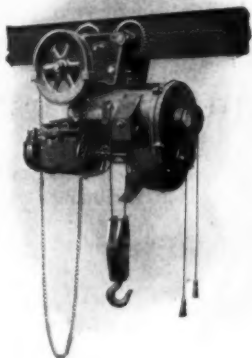


HOW? One Canton does the work of from 6 to 10 men lifting and lugging castings, machinery, etc., in perfect safety.

"The Handiest Tool In the Shop"

saves time, toes, temper and money. Made in several sizes, and furnished with double gears when so desired, at small extra cost. Sent out on 30 days' free trial. Let us send Catalog E-8 so you can decide on the size wanted.

CANTON FOUNDRY & MCH. CO., Canton, O.



A type "U" Hoist in your plant will replace from 10 to 15 laborers—and it will pay for itself in less than 90 days.

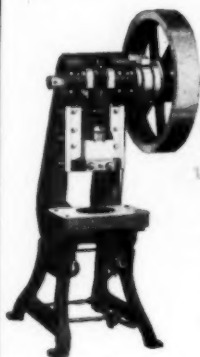
Built in sizes from ½ Ton to 6 Ton capacity.

We'll be glad to mail you Bulletin 301-B and prices.

PAWLING & HARNISCHFEGER CO.
MILWAUKEE WISCONSIN

Speed, Power, Strength

Are combined to the
Fullest Extent in



HIGH DUTY
ROCKFORD
PUNCH PRESSES

Made in **Straight Side** and
Inclinable types and various
sizes. Specially adapted for
Manufacturing.

Write for complete details

Rockford Iron Works
Rockford, Ill.

Power Press or Drop Hammer Automatic Safety Device

Indorsed by Insurance Companies



Leading Connecticut companies offer a 30 per cent rate reduction where the Keyes Safety Device is used.

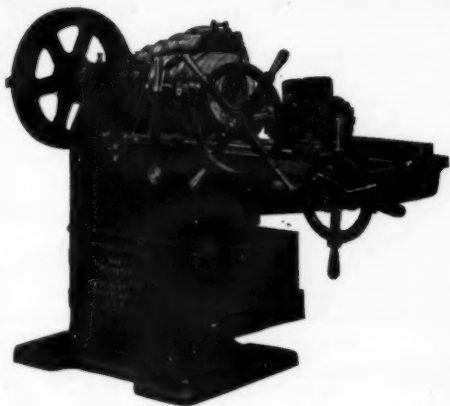
Actual tests show that production is not reduced, as it gives operators confidence.

The hand fits into a strap similar to a fingerless glove, which *automatically draws it away* as stroke is made. Easy to attach and inexpensive.

Prevention is better than cure—write us today

THE H. C. HART MFG. CO.,

Unionville, Conn.



Reliance Bolt Cutters

Built in sizes $\frac{3}{4}$ inch to 6 inches, Single, Double and Triple, of the most up-to-date design. There is, also, a good reason why the "Reliance" is such a satisfactory machine for accuracy of threads cut, large production and low cost of maintenance, even in the hands of inexperienced labor. A lot of this reason is in the Opening Die Head, and we would like to tell you all about it. Interesting information for the asking.

The Foote-Burt Co., Makers
Cleveland, Ohio

YOU Want Tool Holders that have MADE GOOD

Armstrong Tool Holders

Were Awarded The

Grand Prize

**The Highest Possible Award at the Panama-Pacific
International Exposition—1915**



They Always Make Good

They Are Used in Most of the Big Machine Shops of the World

Send for Catalog

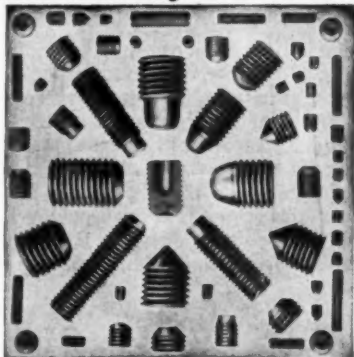
Armstrong Bros. Tool Co.

"The Tool Holder People"

308 N. Francisco Ave., Chicago, U. S. A.



Allen Safety Set Screws



Send for circular No. 13 and sample screws (for testing).

ALLEN MFG. CO., - Hartford, Conn.



Heat-Treating of High Speed Steel

At a Temperature of 1700 Fahr.

Insuring Maximum Hardness and Toughness, Without Danger of Distortion, Pitting or Breaking

HETZY is what does it.

What is HETZY? It is a wonderful new preparation which eliminates uncertainty and costly failure from the treatment of high speed steel, and brings it down to a fool-proof proposition.

**Prove the Merit of HETZY Yourself
Entirely At Our Expense and Risk**

Put up in 100 pound containers only. Send for one, follow directions closely, and try it for 30 days. If results are not as stated, return what is left at our expense, and your bill is paid.

Bennett Metal Treating Co.
Elmwood, Connecticut

Combination Disc Grinder & Roll Sander

"Best machine ever built for pattern shop use"

Patented



The No. 20 Gardner combines both the disc wheel and the sanding roll into a compact, sturdy and accurate machine. The disc wheel is used for producing flat surfaces and external curves; the sanding roll perfects internal curves which have been roughed out on a band saw.

Both this disc wheel and the roll remove stock with extreme rapidity and accuracy. With this machine at hand your apprentice boy can do, with greater speed and quality, much of the work formerly done by your best man. A Gardner No. 20 soon pays for itself in any modern pattern shop working four or more men.

Get the details today

Gardner Machine Co.

The Disc Grinding Authorities

Beloit, Wisconsin

Largest Disc Grinder Builders in the World



The *Greenfield*

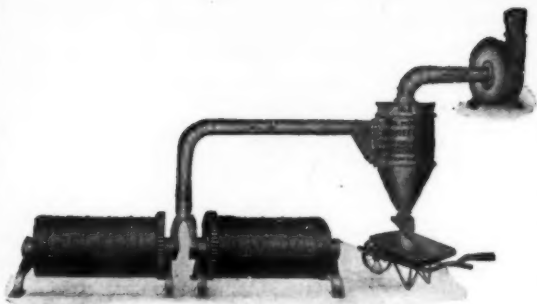
For Special Work, Tools, Jigs, etc.

This Universal Grinder is just the machine needed in many of the shops engaged in equipping for the manufacture of special lines. It is an all-around grinder and will handle about any kind of a job that comes within its range.

It will turn out accurate, dependable work. Also, we believe we are perfectly correct in stating that we furnish this machine with a larger and more complete set of attachments than can be had for any grinder selling at anything like the same price.

We also build Plain Grinding Machines for production work

Greenfield Machine Company
Greenfield, Mass., U. S. A.



The Air is Drawn—Not Pushed

With Morse "Rarefied" Dust Collectors



Knickerbocker Says:

"THE MORSE is operated on the "rarefied" or partial vacuum principle, consequently the air is drawn through the collector, not pushed through as in old style machines. This removes the dust before the air reaches the fan, and the latter is not worn out by the abrasion of fast-moving particles of grit and sand.

"The Morse is operated in many of the largest plants in the country. One user says it has reduced the horse power formerly needed to nearly one-half. It is economical, thoroughly efficient, and exceptionally long lived.

*A list of prominent users and a copy of our instructive
Booklet mailed you on request.*

The Knickerbocker Company
Jackson, Mich.

This is An Inexpensive
Cutter, Reamer and Drill Grinder

It has Generous Range and Capacity
The Price is Within Your Reach

Don't delay—look it up now!

Particulars, prices, etc., sent on request.



Style BX

We also make

Drill Grinders—Surface Grinders—
Lathe Center Grinders—Universal
Grinders—Tool Grinders—etc.

Wilmarth & Morman Co.

1185 Monroe Ave., Grand Rapids, Mich.

Install Your Lockers for Present Needs

Then Add to Them as Required



Terrell's Unit System Of Steel Lockers

permits your installing only what you need now, then changing them about or adding to them as occasion requires, as you would handle a sectional book-case.

Terrell's Steel Lockers are rapidly replacing wooden makeshifts, because modern shop practice is toward permanent, solid construction, with its ultimate economy.

They are sightly and sanitary; they save space, fire risk, insurance and repairs; they add to the self-respect and content of the workmen.

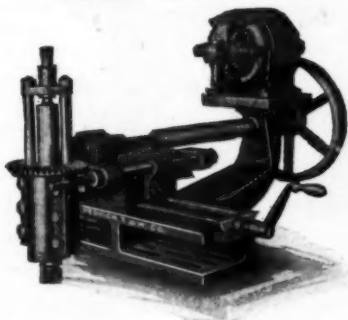
Made in many styles. State your needs, and we will send full details.

Terrell's Equipment Company

Hall & Division Sts., Grand Rapids, Mich.

And ask about our Adjustable Unit System of Shelves and Bins, which are easily changed from one to the other, or removed, extended or reduced to fit changing conditions, either with or without steel doors.

If You Only Knew The Merits



Of the Pedrick Portable Milling Machine, we couldn't make them fast enough.

The first machine of this type we made has not been allowed to leave the factory. It is in such constant demand that it could never be spared. And yet one would think that in our line of work it would find but a limited field.

The page could be filled with descriptions of its varied operations, but the point we wish to make is this—our machine will do a job that is too large to handle on any standard machine tool, do it in position and save you time and expense enough to pay for its cost in one or two usings.

Send for our catalog and think the matter over.

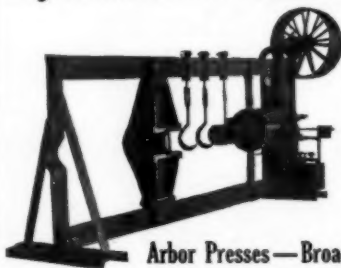
**When you think of Portable Machine Tools,
think of Pedrick.**

Portable Boring Bars, Crank Pin Turners, Pipe Benders, etc.

Pedrick Tool & Machine Co.

3644 N. Lawrence St., Philadelphia, Pa.

Hydraulic Wheel Presses



100 Tons

150 Tons

200 Tons

300 Tons

500 Tons

WARRANTED

Arbor Presses — Broaching Presses

Presses for any purpose

Write for catalog of Hydraulic Machines

LOURIE MFG. CO., Springfield, Ill.



No. 24 Press

Efficient Equipment Atlas Presses

for building and repairing automobiles and general machine shop operations requiring pressure up to 25 tons and centering capacity up to 38 inches.

For driving mandrels; bending and straightening, broaching, embossing with dies, setting bushings and many other every day manufacturing jobs, there is an Atlas Press. All sizes for all purposes. *It will pay you to investigate.*

Atlas Press Co.

317 N. Park Street,
Kalamazoo, Mich., U. S. A.

Every Shop Needs

a

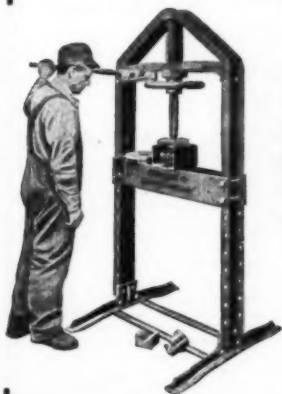
WEAVER

20-Ton Press

**Quick Acting;—Powerful;—Roomy
Leverage 1500 to 1**

This Press will reduce your labor cost and increase your production and efficiency.

It will pay for itself in two to three months.



Construction

Heavy 5-in. channel steel frame; hand wheel 15 inches in diameter, carried upon ball bearings. The thrust of the screw is directed against heavy Bronze Thrust Bearings. Screw 2 inches in diameter with 3-pitch Acme thread. Range of movement, 12 inches. The screw does not revolve.

Net Price

Complete With
Equipment

\$56⁰⁰

Weaver Manufacturing Co.

2179 So. 9th Street,

Springfield, Illinois

Your Oil Bills Reduced

With a Curtis Oil Extractor



No. 400 — Capacity: 2 Bushels

It's a simple, inexpensive method of lowering those steep oil bills. Place your oily chips, shavings or waste in this sturdy, ball bearing machine, turn on the power for a few minutes, and the trick is done.

In this way the oil is used over and over again, and your expense is reduced in proportion. The Curtis returns its cost in a short time.

Your Choice of 3 Sizes

Let us send you details and prices

A. B. Curtis Co., P. O. Box 44,
Worcester, Mass.

Safety, Convenience and Economy In Handling Bar Stock



"The Handiest Racks"

Enable you to store your pipe, shafting and bars in much less space, where it is easy to keep them counted and properly assorted, where they are out of the way, and where they may be handled in and out with the greatest facility.

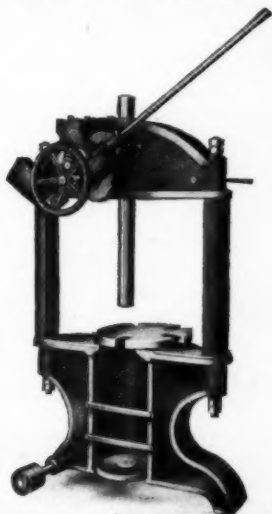
These common-sense racks are permanent fixtures which make for good housekeeping—for safety, economy and convenience—long after their moderate cost is forgotten.

*Write today. Foundry
costs are advancing.*

Wm. S. Yohe Supply Co.
314 Lincoln Way, West, Canton, Ohio

Greenerd Arbor Presses

From 15 Lbs. to 35 Tons Pressure
Save Time, Material and Money



No. 17. Leverage, 250—1. Weight, 2100 Lbs.

Our New Catalog

—includes a number of Special Presses and Attachments that are eye-openers. It is full of new and useful hints on how to save time, material and money.

How shall we address your copy?

Edwin E. Bartlett,

**336 A Street
Boston, U. S. A.**

14,000 rivets headed for \$1.00 on a
Grant Noiseless Riveting Machine



A boy or girl at \$1.00 per day can head 14,000 rivets on bicycle mud guard braces in ten hours.

Rivet heads formed by this machine have a highly polished finish.

The machine is absolutely NOISELESS in operation.

Breakage of castings or marring of surface of articles being riveted, entirely eliminated.

We can furnish machines for belt or motor drive for rivets up to $\frac{3}{8}$ " in diameter.

Send us samples to be riveted and returned to you Catalog?

The Grant Mfg. & Machine Co.
 C. E. Station, Bridgeport, Conn.

Do You Use Air?

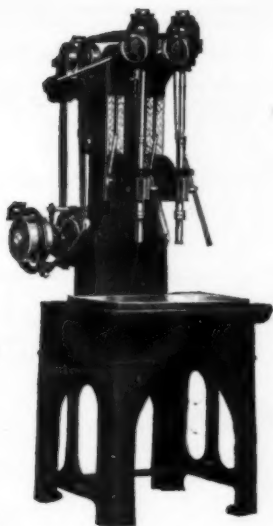
**THE POWELL
 AIR GUN VALVE**

"JUST PRESS"
 THE BUTTON

**BUY
 POWELL
 AIR GUNS
 KEEP
 CLEAN**

**CLEANS
 WORK BENCHES
 AND
 MACHINE TOOLS
 MADE IN SIZES
 $\frac{1}{8}$ " TO 1"**

**ORDER A SAMPLE
 THE W. M. POWELL CO.
 1200 DRAPER ST.
 CINCINNATI, O.**



With
One
to
Eight
Spindles

For
 $\frac{3}{4}$ -in.
Drills
and
Smaller

Why Select

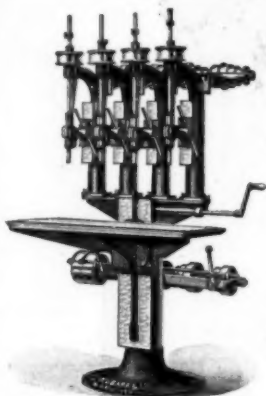
H. & W. Sensitive Drilling Machines?

Our 252 Varieties give you the widest choice of styles and sizes. If we can't furnish with the sensitive drilling machine that is precisely adapted to your needs, then "there ain't no such animal."

Gearless Power Transmission, under perfect control, with frictionless bearings, means the maximum of power and speed delivered at the drill point—therefore, the greatest drilling capacity.

*May we figure on your drilling requirements?
And present you with our Feed and Speed Chart?*

The Henry & Wright Mfg. Co.
760 Windsor St., Hartford, Conn.



The Well Known
H. G. Barr Line
 of
Sensitive Drills

with one to six
 spindles.

*Send for catalog
 if interested*

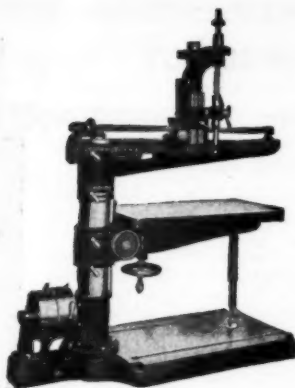
Francis Reed Co.
 43 Hammond St.
 Worcester, Mass.

PERFECT in its ease and freedom of operation, and exceptional in its prompt and exact response to control—that's the Gang Radial—"as the eye is." Naturally, capacity is increased and accuracy assured.



For Details and Reasons
 see our Radial Book.
 A postal brings it.

THE WM. E. GANG CO.
 Cincinnati, O.



Lightest Machine of Its Kind

**But This 3-ft. "Sensitive Radial"
Is Thoroughly Rigid in Construction**

If you are drilling small holes in big, heavy, hard-to-handle pieces on the ordinary drilling machine, this "T. & F." will prove a revelation to you as a cost reducer. It often doubles and even trebles the capacity without adding to the labor cost.

It has all the desirable features of our standard line, and is exceptionally easy to handle and adjust. Can be made to cover nearly all drilling requirements within its range by using drilling heads of different types.

*Let this T. & F. save for you while serving.
Details and cost records are yours for a postal.*

The Taylor & Fenn Company
Hartford, Conn.

Keyseater

For Milling

Internal Keyseats

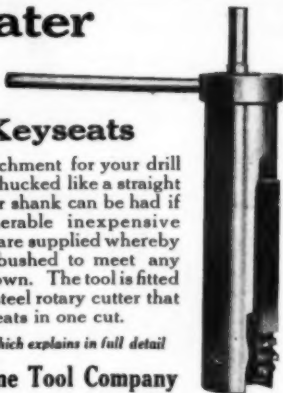
This tool is an attachment for your drill press. It can be chucked like a straight shank drill. Taper shank can be had if required. Innumerable inexpensive eccentric bushings are supplied whereby the tool may be bushed to meet any diameter above its own. The tool is fitted with a high speed steel rotary cutter that mills internal keyseats in one cut.

Write for Catalog O which explains in full detail

National Machine Tool Company

2268 Spring Grove Ave.,

Cincinnati, Ohio



**Versatility, n., quality of being
..... many sided; variable.**

—WEBSTER.

¶ If you have a tool that you can use for only one job and one size, its usefulness is very much limited, unless it can be kept busy *all the time*. ¶ If you have a similar tool fitted for that single job, but instantly changeable for an infinite number of other jobs which it will do just as well, isn't that by far the more useful tool of the two? ¶ Such a tool is "versatile." The Nicholson Expanding Mandrel is such a tool. ¶ In a set of nine they are instantly available for any size hole, square or round, between $\frac{3}{4}$ " & 7" in diameter.

NICHOLSON
Expanding Mandrel

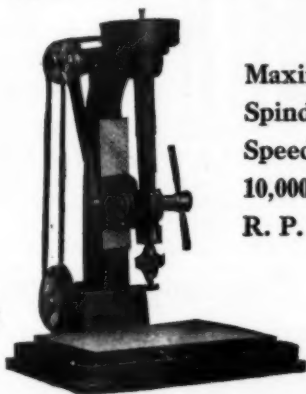
We will gladly send full particulars if you will write today.

W. H. Nicholson & Co.
117 Oregon Street
WILKES-BARRE, PA.



Save Money

with this
High Speed Drill



**Patents
Pending**

**Maximum
Spindle
Speed
10,000
R. P. M.**

**Double Your Production on Holes
up to $\frac{3}{8}$ " in diameter**

**This machine is carefully and accurately built
to give the greatest service. Equipped with
Hess Bright Ball Bearings throughout.**

Ask for Bulletin No. 502

**Leland-Gifford Co.
Worcester, Mass., U. S. A.**



Kelly PRODUCTION Tools



The outfit shown in cut, with three turret bars and 36 type B reamers, gives any diameter in ten thousandths from 15-16ths to 5 5/8 inches. Each reamer has an adjustment of 1/4-inch.

Kelly Boring and Reaming Tools are made for any diameter from 9-16ths to 12 inches and larger.

Write for the Catalog

THE KELLY REAMER CO.
CLEVELAND, OHIO, U. S. A.

C. W. Burton, Griffiths & Co., London, English Agents.
Burton Fils, Paris, French Agents. 40 Domestic Agencies.

For Removing Broken Taps

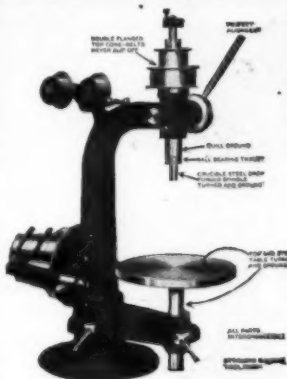


There are three

reasons for the strength of this device for removing broken taps: first, the steel used was selected after tests of a great variety of steels in a machine built for the purpose, and this steel is not hardened dead hard, which would make it as brittle as the tap itself, for it has no cutting edge to maintain; second, the prongs or fingers are shaped to fit the grooves, thus using the maximum amount of material; third, the prongs are at a greater distance from the axis of the tap than is the solid portion of the tap itself.

Write for prices f. o. b. your factory

THE WALTON CO., Hartford, Conn.



Burke Quality Excels on Fine Points

Machines of
Burke Quality
are never built
with any name
cast on the
frame but our
own—

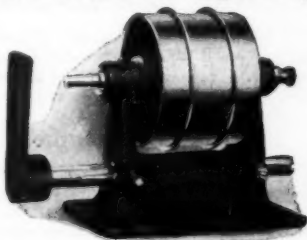
**BURKE
CONNEAUT
U. S. A.**

FOR SALE

300 Bars $\frac{3}{8}$ " x 3" x 30" C. R. Flat Steel
Immediate Shipment, Make an Offer

This Tapping Machine Now Has Greater Capacity

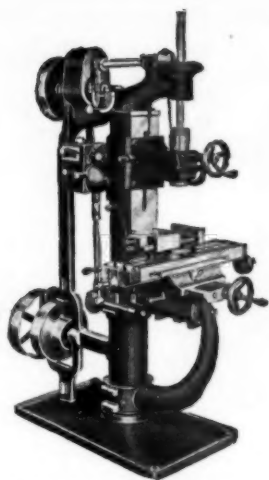
Burke's
No. "D" Taps
 $\frac{5}{8}$ " Holes
in
Horseshoe
Steel



BUILT throughout with exceptional care, our several sizes give service in proportion. Accurate, rapid and convenient, they give solid satisfaction. No. "D" sells for \$45.

Send for details today

The Burke Machine Tool Co., Conneaut,
Ohio



Knight Milling and Drilling Machines

Make Hard Machining Easy

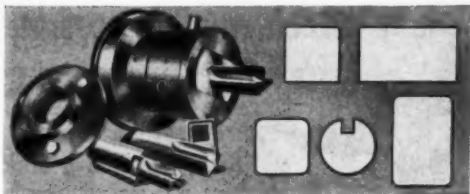
Exceptionally convenient, they have no equal in tool room or experimental department, on dies, jigs, moulds, metal patterns, etc. They save 20 to 50% of time on all kinds of hard jobs. The three sizes weigh respectively 600, 1200 and 2300 lbs.

Our Light Duplex Miller

is especially designed for light manufacturing jobs that can be milled on two sides at a time, such as frames of typewriters, adding machines, cash registers, etc.; also good for milling flats, squares, and hexagons on shafts, tools and special nuts.

Details of these great cost reducers on request

W. B. Knight Machinery Co.
St. Louis, Mo.



The Radical Boring Head

Saves 90% and Upwards of Cost of Broaching

It drills square holes with sharp corners—
Or square holes with round corners—
Holes with flat bottoms or through bottoms—
In all metals, including chrome vanadium steel.

It is Not a Machine, But a Tool

The "Radbore" Head is not a costly machine, but a comparatively inexpensive tool that fits your lathe or milling machine, replacing the broaching machine, the key-seater and slotter.

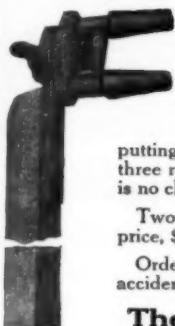
It reduces the operating cost nine-tenths and upwards, it requires a much smaller investment, and it insures work of such accuracy that it does not require hand finishing.

*Write for booklet; also let us drill a sample
of your work and make you a cost estimate*

Radical Boring Head Corporation

90 West Street, New York City

Make Accidents Impossible



The way to prevent accidents is to make them impossible. Otherwise one is likely to happen any time. Our

"Safety First" Belt Stick

makes accidents impossible in putting belts on to moving pulleys. With three rollers, two of them tapered, there is no chance of the hook getting caught.

Two sizes, 1 to 4" and 4 to 6", at one price, \$1.25 each or \$12 a dozen.

Order a few on trial *now*—*before* the accident—then there won't be any.

The Ready Tool Co.
Bridgeport, Conn.

Rearwin Die Filing Machines



Increases the Output Decreases the Cost

Does both large and small work. Any standard file 4" to 12" length can be used. Stroke adjusted from 1" to 7". File releases on up-stroke. Shaft or motor drive gives rapid production and a uniform degree of clearance in your dies or other work where straight filing is required. Hack saws can be used for making templates.

Adjustable Speed Stroke & Table

*Descriptive circulars and
prices sent on request.*

W. D. Rearwin

341 Mill Ave., Grand Rapids, Mich.

Cochrane-Bly Company

Rochester, N. Y., U. S. A.

Manufacturers Of

Metal Sawing Machines

Made in five sizes, to cover every manufacturing requirement. Their thin milling saws combine high speed with the closest economy in high-priced steel.

Automatic Saw Sharpeners

Made in two sizes, for saws up to 15" and 24" in diameter. They grind and bevel at one operation the high and low tooth type milling saw.

Die Filing Machines

Made in two sizes, for the accurate filing of dies, punches, metal patterns, jigs and special gauges, and for filing duplicate parts requiring a close finish.

Universal Die Shaper

For die making and general tool room work. Operates both shaper ram and milling spindle at any angle.

**When considering this class of equipment,
would appreciate being consulted.**



"DUPLEX"

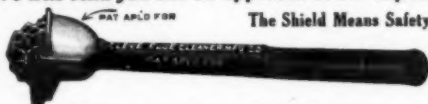
Handle equipped
with our

Diamond Cutter

means economy, efficiency
and **SAFETY**

Patented August 20, 1912

We will send you one on approval at our expense



The Shield Means Safety

Drop us a card; we will do the rest

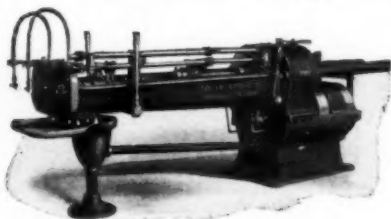
Cleveland Flue Cleaner Manufacturing Co.

321 Frankfort Ave., N. W.

Cleveland, Ohio, U. S. A.

Broaching Machines

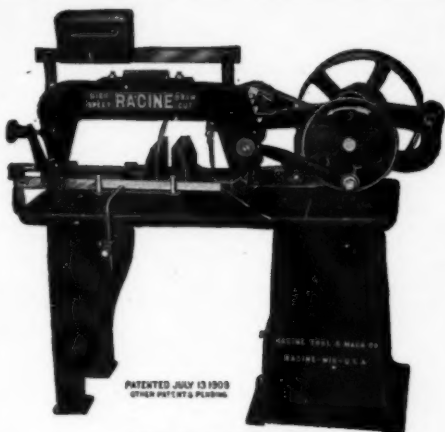
And Broaching Tools



Our Famous Double Machine

The Most Complete Line In The World. We make our machines in 5 sizes and 11 types. ***Send for particulars.***

THE J. N. LAPOINTE CO., - - New London, Conn.



No. 1—Eats Steel

Why Is It

That so many large shops are now equipped and being equipped with

The Newly Improved Racine High Speed, Metal-Cutting Machine?

FOR MANY GOOD REASONS—among others—because for speed, accuracy, economy and ease of operation THE RACINE cannot be surpassed. You MAY NEED ONE NOW. We will send a RACINE on any trial basis that is fair. WRITE US or any good dealer.

Racine Tool & Machine Co.

1500 Junction Ave. S., Racine, Wis., U. S. A.

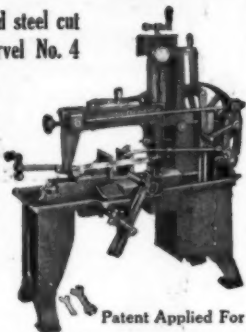
Cuts 6-in. Steel In 10 Minutes

Smaller sizes of cold rolled steel cut in proportion by the Marvel No. 4

—a high grade, improved tool with the speed, accuracy and convenience that insures bed-rock economy.

Cuts on the draw stroke and lifts free of the cut on the return. A graduated feed wheel gives any desired pressure on the saw blade.

*Also other hack saws,
punches and shears.
Write for circulars.*



Patent Applied For

Armstrong-Blum Mfg. Co., 341 N. Francisco Ave.
CHICAGO, ILL.

Peter Bros. Abrasive Cutter Saves Material, Labor & Time

The 1-16 inch Saw Goes Through Anything

Cuts off High Speed Steel as if it were wood, and practically without waste. Reamers, drills, forming tools, as well as tubes, rods, and bars of brass, copper or aluminum are cut smooth and square. Doesn't draw the temper, and saves grinding. Its use spells e-c-o-n-o-m-y in tool room and machine shop.

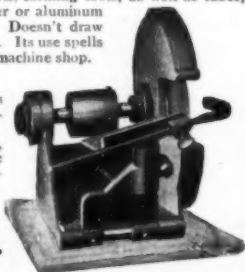
8" Size, \$17.50, with C. S.
Splendid for tool room. Cuts high-speed steel up to $\frac{1}{2}$ " square.

12" Size \$44, with C. S.
Cuts up to $2\frac{1}{2}$ " diameter, round or square, at any angle up to 45 degrees. Ball bearing.

15 Days' Free Trial

Write us or ask your dealer

PETER BROTHERS MFG. CO.
115 Railroad St., Algonquin, Ill.



Are You Behind On Cutting Your Steel?

Then read these two paragraphs from a customer's letter. Could anyone expect to hear so favorably from a customer after waiting eight weeks for delivery on machine? It was real production and satisfaction that prompted them to write this letter.

"On arrival of this machine we were so far behind on cutting that we thought sure one or two more machines would be required for our work, but owing to the high speed and the rapid cutting of this machine it has caught up with our work in a short time. We are now more than pleased that we had the patience and waited delivery on this tool, even if we were put to considerable inconvenience, as a lot of our work had to be sent out to be cut.

"We must say that this tool is certainly a great time saver in actual time saved in operating the machine. We figure the operator's time saved alone will soon pay for this tool."

Several other interesting facts in this letter. Would you like a copy, together with other descriptive matter?

This machine cuts off 2 1/4" round Manganese bronze in 12 seconds.
Compare this with your cutting time.



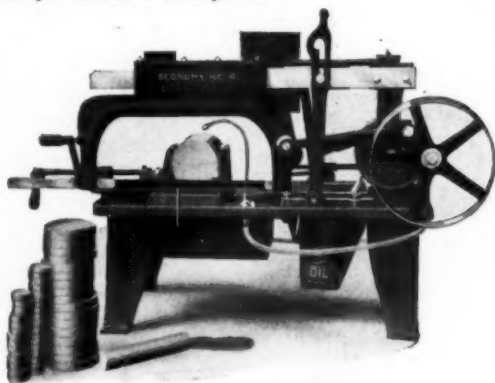
Note its rigid construction; it means increase in production.

Peerless Machine Co., 1609 Racine St., Racine, Wisconsin

Economy Power Saws

They Give Best Results Per Hour, Per Man

There are nearly 18,000 Economy Power Saws in satisfactory use, in installations of from one to thirty machines in a plant.



No. 4, High Speed; Capacity 8x8 inches

Economy Power Saws Are (Ma

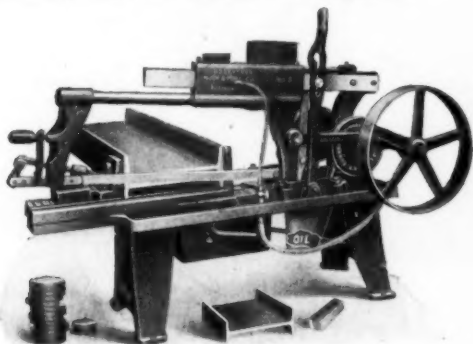
We cut under actual service conditions 2-inch steel in 3½ minutes; 5-inch in 18 minutes. One customer cut 15 tons of I beams with one blade, showing exceptional blade economy due to the oil compression lift. We have cut 570 sq. ins. of c.r. steel with only 30 cents' worth of blades. With

They Will Save You Money On Your

W. Robertson Machine & Foundry

W's Are Money Savers

, Per Blade, and Per Dollar of Expense



No. 5, High Speed, Adjustable Frame, 10 to 24 inch Blades

The Oil Compression Lift

The only practical lift for a power saw. No attention required; never fails. Cannot break blades by frame falling. In actual use it makes blades last twice as long, which is a saving worth while.

Making Records Every Day

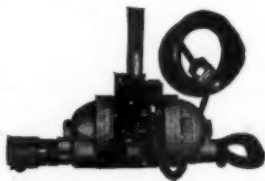
the adjustable frame, blades are used in lengths appropriate to the size of stock, which effects another important saving. Economy saws are simple to operate, and embody every known good feature for accuracy, rapid production and low cost of operation.

On Your Cutting; Let Us Show You.

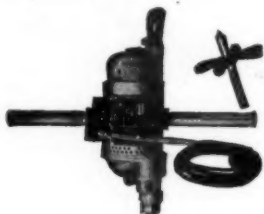
& Foundry Co., Buffalo, N. Y.

Universal Motor Drills

For Use On Either Current



This drill is made in 3-16", 1", 3/4" & 1/2" size. Gears run in grease. Motor air cooled, and is made to stand hard service. Sent on trial.



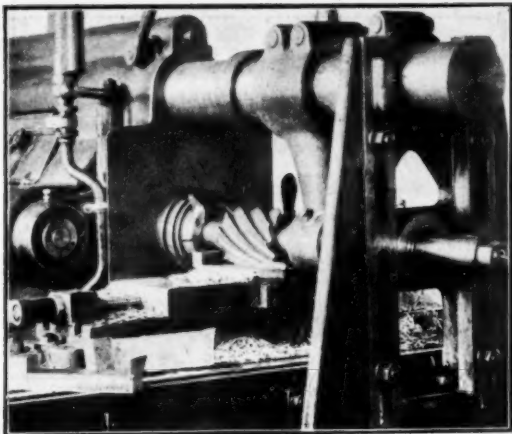
0 to 7/8 Universal Drill

The motors used in these drills are Westinghouse motors, and operate on 25, 30, 40 or 60 cycle. 110 or 220 volts.

The U. S. Electrical Tool Co.
Cincinnati, Ohio

NEW YORK, 30 Church St. CHICAGO, 549 W. Washington Blvd.
BOSTON, - 12 Pearl St. ST. LOUIS, - 610 Commercial Bldg.

Stock carried at branch offices.



Doubly Efficient

**Handling a heavy milling job on a B. & S. Heavy
Service Milling Machine using B. & S.
Coarse Tooth Milling Cutters**

That's the way to secure economical results. With these cutters on the job you can take deep cuts, use fast feeds and do a lot of work between grindings. They cut fast and freely and consume a minimum of power.

If you have B. & S. Milling Machines and you want to get the best possible results always specify "Brown & Sharpe Cutters" on your orders and realize the full efficiency of this B. & S. combination—powerful machines and high grade cutters. You will find that it pays.



Write for our Catalogs

**Brown & Sharpe
Mfg. Co.**

Providence, R. I.

Vul-Cot Fibre

When you buy Vul-Cot Fibre for any purpose your purchase is doubly protected by trade marks.

The name Vul-Cot is a trade-mark in itself. It is registered in the U. S. Patent Office.

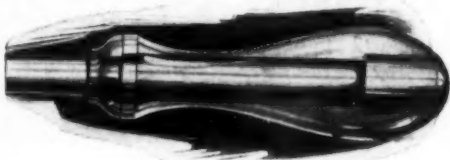
It guarantees the quality of the material--the very highest obtainable.

The Indian Head in the circle is the trade-mark of the whole enormous business. It goes even further than that of the product. It is a guarantee of resources, facilities, reputation and 40 years of engineering and chemical experience.



It is a guarantee that the fibre you buy is made by the biggest producers in the world of vulcanized fibre in sheets, rods, tubes, bars and ready-machined.

If there is anything at all you wish to know about Vul-Cot Fibre, whether for existing or possible uses, write the American Vulcanized Fibre Company, 560-570 Equitable Bldg., Wilmington, Delaware, U.S.A. Don't hesitate--there is no obligation.



Quick Action

This is what we call this new Machine Handle. Attached to any power tool, especially the heavier types; adjustments are made with more speed and less effort.

All kinds of standard and special Handles from steel for power tools and similar purposes.

Send for Catalogue and prices

The Cincinnati Ball Crank Co.
Oakley, Cincinnati, Ohio

RELIANCE

ADJUSTABLE SPEED

MOTORS



These motors run at any speed over any range up to 1 to 10. For instance, with a 2 h. p. motor having a speed range of 400-1600 r. p. m., you get any imaginable speed within these limits.

No electric controller is used for changing the speed. Just turn the handwheel to get the right speed to suit any job.

Reliance Motors will keep your machines at a top-notch production rate on all kinds and sizes of work.

Get the details in Folder 10 L.

(We build constant speed motors.)

Reliance Electric & Engineering Co.
1050 Ivanhoe Road, Cleveland, Ohio

Hard Jobs Made Easy

Van Dorn

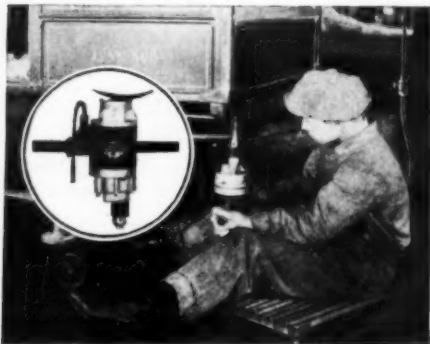
Portable Electric Drills

Think of drilling this job by hand! A Van Dorn Electric Tool works up-side-down as well as right side up. Just place the drill on the spot and a touch of the switch does the rest.

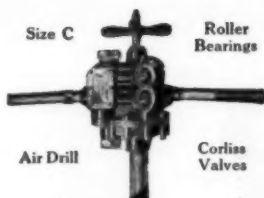
It doesn't take a skilled mechanic to operate it. You can depend upon a Van Dorn to do the job no matter who is behind it.

It's easy for us to prove that Van Dorn Drills will save you money. Let us give you the facts.

The Van Dorn Electric Tool Co.
2696 East 79th Street, Cleveland, Ohio



Thor Roller Bearing Piston Air Drills



All sizes in the reversible and non-reversible types, for all kinds of work, such as drilling, reaming, tapping, flue rolling, wood boring, tightening up nuts, stud driving, boring cylinders, etc.

Furnished on Ten Days' Trial

All Thor tools shipped on trial. Write nearest branch for particulars. Circular "W" shows complete line.

**Independent Pneumatic
Tool Company**

Chicago New York Pittsburgh Detroit
San Francisco Birmingham Montreal

Tucker's Safety First



Closed

Oil Hole Covers

Require but one hand to pump in the oil. Adapted to all kinds of mechanism having oil holes leading to a bearing.

*Send for Catalogue
Oil Hole Covers
and Compression
Grease Cups*



Open



Style C



Style F, Drive



Style A



Style D



Open



Closed

Compression Grease Cup



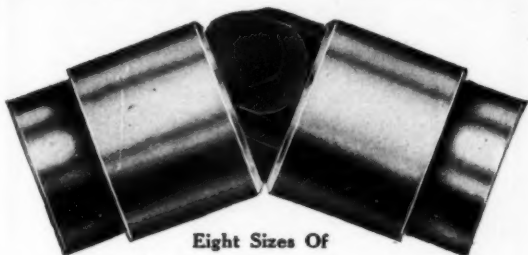
Style B



Rotary Head

W.C. & F.C. TUCKER, Hartford, Conn.

Strong, Positive Angular Drives



Eight Sizes Of

Universal Joints

From $\frac{3}{4}$ inch to $2\frac{1}{2}$ inches, with solid blank ends, carried in stock for immediate delivery

They transmit a thrust or tension without play or looseness in any direction.

All wearing parts are thoroughly case-hardened.

They are provided with perfect lubrication without grooves or recesses to collect dirt and grit.

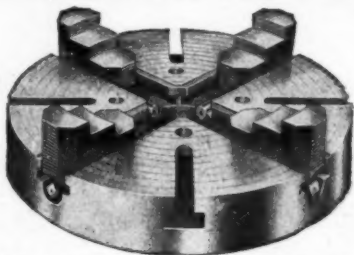
There are no sharp edges to wear other parts.

There are no screws or small parts to get loose.

Thousands of our Universal Joints have been in use in Europe and America during the last ten years, and the experience of users everywhere has been so satisfactory that we cannot recommend them too highly for all purposes wherever angular drives of this character may be employed.

Send for our literature; it is interesting and informative

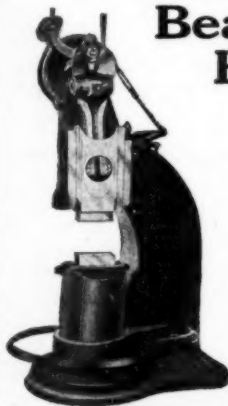
GRAY & PRIOR MACHINE CO., Hartford, Conn.



A Chuck that Stands By You
 through time and abuse is the "Sweetland." Remarkably accurate.

Shall we send you the Catalog?

The Hoggson & Pettis Mfg. Co.
 New Haven, Conn., U. S. A.



Beaudry Hammers

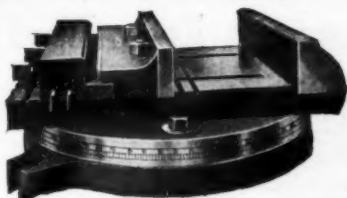
For General Forging

**Saves Fuel, Time
and Labor.**

**Cuts Forging Costs
in Two.**

Belt or Motor Driven

Beaudry & Co., Inc.
 141 Milk St., Boston, Mass.



With
Round
Swivel
Base

The Heavy Guns

In the Family of Planer Chucks

Light weight chucks, like light guns, have their uses. But Skinner Planer Chucks are not that kind. Like the heavy guns in the game of war, they are made for a purpose for which the other kind are useless.

They are heavier and stronger than any other planer chuck on the market, and are made in 16 sizes for use in railroad shops, in steel mills, or wherever the requirements are most severe.

Skinner Lathe Chucks, Drill Chucks, Drill Press Vises and Face Plate Jaws are also standard tools of ingenious design, careful construction and proven merit.

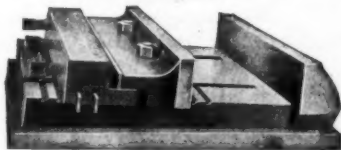
*You are on the firing line—we don't know where
Send your name and address for interesting data*

The Skinner Chuck Co.

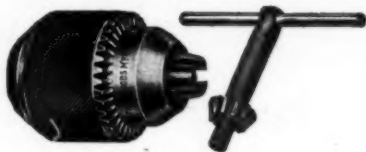
New York Office:
94 Reade Street.

Factory and Main Office:
New Britain, Conn.

With
Square
Base



Our Customers Know Why!



Patented Sept. 16, 1902

Why have our first customers, without solicitation, continuously and increasingly purchased *Jacobs Improved Drill Chucks*?

Our illustrated catalog "H" sent upon request.

The Jacobs Manufacturing Co.
Hartford, Conn., U. S. A.

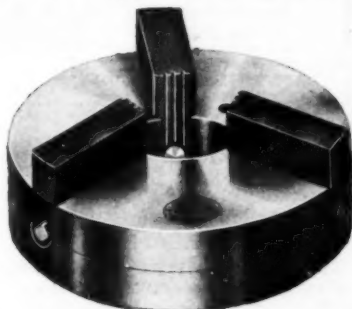


We manufacture a great variety of
Lathe Chucks, Drill Chucks, Centering Chucks
Also
Portable Jaws for Lathe face plates and Machine tables.

Let us send you our Catalog

The Cushman Chuck Co.
Established 1862 **Hartford, Conn.**

A Quick Acting Cutting Off Chuck



Cut shows the Union Extra Heavy
Screw Type Cutting Off Chuck No. 27.

A geared rack and square thread screws
move the Jaws to and from the center.

All parts are Extra Heavy, enabling the
Chuck to withstand Heavy Strains.

Made in four sizes, 9-11-14-17, taking
bars from $1\frac{1}{8}$ " up to $5\frac{1}{8}$ " in diameter.

THE UNION CATALOGUE

Shows Chucks for Every Need

Union Manufacturing Co.

New York Office,
26 Cortlandt St.

New Britain, Conn.

Makers of a Complete Line of Chucks

Pattern Shop Machinery

Special Prices if you refer to this ad.



Band Saws

Chicago No. 00 27 in. Wheels
" No. 0 32 " "
" No. 1 36 " "



Saw Tables

Chicago No. 5 Stationary Table
" No. 9 Tilting Table
" No. 10
Boring attachment if wanted.



Jointers

8 in., 5 and 6 ft. tables and guard.
12, 16, 20, 24 and 30 in., 7 ft. tables
and guard.

Trimmers, Lathes, Core Box Tools, etc.

Ask for full descriptions

Chicago Machinery Exchange

1214-1228 Washington Boulevard, Chicago

WHEN YOU INQUIRE

of advertisers herein, won't you kindly remember to say somewhere in your communication that the inquiry comes from Hitchcock's Machine Tool List? Advertisers are human; they like to know that the medium in which they spend their money is received and consulted by machinery users. Not being mind readers, they can only know this when you tell them, and if you neglect to tell them, the Tool List is deprived of credit for the service it has rendered.

Contract Work Wanted

This department is exclusively for those desiring machine, press or die work on contract. Advertisements must be set in uniform style, as shown, and without other display, or any variation in arrangement or in kind or size of type. The heading must express, as nearly as possible, the particular sort of work wanted, in order that any facilities offered may be easily found. Rates: one-eighth page, three months, \$12; one year, \$40.

Stampings by Contract

We have complete facilities for stamping, drawing and forming of sheet metal. Our presses are best suited for medium and large size stampings. We are equipped for baked enameling, spot and acetylene welding. Send us sample, sketch or blue-print for estimate. **The New Britain Machine Co., New Britain, Conn.**

Dies, Tools—General Machine Work

We are equipped to render satisfactory service on all kinds of general machine work. No job too big or too difficult. Established 1876. **Chicago Die & Machine Works, 415 N. Carpenter St., Chicago, Ill.**

Brass Castings—Sand Blasted

Castings of every description made in brass, bronze, copper, aluminum and white metals, ranging in weight from 1 ounce to 1,000 pounds each. Specially equipped with power moulding machines for the handling of split, gated and plate patterns. All castings sand blasted. **Faunt Bros., 1555 Fulton St., Chicago, Ill.**

Metal Stampings—Screw Machine Products

Give us the amount of pieces required of each style. The larger the quantities the closer we can figure. We require absolutely accurate work in our own manufacturing departments, and our rigid inspection service is at your command. **Harvard Electric Co., 527 W. Van Buren St., Chicago, Ill.**

Screw Machine Products—Brass Castings

Right prices. Prompt deliveries. High-grade work. Send us samples or blue-prints for quotations. **Hill Pump Valve Co., Archer Avenue, Canal & 23rd Sts., Chicago, Ill.**

Special Machinery and Punch Press Work

Dies, tools and general machine work. Manufacturers of metal specialties. We are equipped to handle your requirements to your best advantage. **Illinois Die & Tool Works, 162 N. Desplaines St., Chicago, Ill.**

Brass, Bronze and Aluminum Castings

Castings of every description made in brass, bronze or aluminum. Brass finishing, screw machine and punch press products. Polishing and electro-plating. We are fully equipped to furnish complete brass and metal parts of every description. **Kelly Brass Works, 226-232 W. Ontario St., Chicago, Ill.**

CONTRACT WORK WANTED

Inventions Perfected

Years of experience in this work enable me to render you a satisfactory service. Special and automatic machinery a specialty. **R. D. King, Consulting Engineer, 519 Moradnock Bldg., Chicago, Ill.**

Brass Finishing—Metal Patterns—Screw Mach. Products

Special brass work of every description, metal patterns and screw machine products. With a well-lighted shop, good tools and good mechanics, we believe we can satisfy you with our service. **B. W. Pokorney & Co., 132-134 S. Clinton St., Chicago, Ill.**

Punch and Die Work—Experimental and Model Work Patented Articles Manufactured on Contract

We are well equipped to design and make special machines and tools; to handle experimental and model work, also punch and die work, and to manufacture patented articles on contract. Your inquiry is solicited. **Pollard Engineering Co., 165-169 N. Jefferson St., Chicago, Ill.**

Sheet Metal Stamping, Dies and Tools

We solicit your inquiry for sheet metal stamping. Manufacturing a specialty. **Walter L. Schultz, 29 S. Clinton St., Chicago, Ill.**

Light Manufacturing, Dies, Tools, etc.

Exceptional facilities for light manufacturing, and especially for the economical production of loose leaf metal parts, of which we make a specialty. We also do accurate work on dies, tools, etc. Our figures will interest you. Send samples or blue prints for estimates. **Triple S. Machine Co., 1008 Wellington St., Chicago, Ill.**

General Machine Work—Dies, Tools, Models Punch Press and Screw Machine Work

We are equipped to render the best of service in dies, tools, models, punch press and screw machine work. Specialties for bicycles and motorcycles. **L. Wilson Novelty Works, 222 S. Clinton St., Chicago, Ill.**

Milling Machine, Screw Machine, Drill Press or Punch Press Work

We can handle a large amount of small, accurate work of this character. Send samples or blue prints and we will gladly submit prices. **Galesburg Writing Machine Company, Galesburg, Ill.**

Tools, Dies, Jigs, Fixtures and General Machinery

We make prompt deliveries and our work is guaranteed. **McHugh Bros., 111 S. Water St., Rockford, Ill. (Successors to Winnebago Machine & Tool Co.).**

CONTRACT WORK WANTED

Jigs, Dies, Tools—Stampings and Electro-Plating

Rockford Metal Specialty Co., Rockford, Ill.

Jigs, Fixtures, Machine Parts, Gears and Racks

We have facilities for special machine work, parts, jigs, fixtures and rapid process gear cutting, short rack. **Geo. A. Schipper, Aurora, Ind.**

Screw Machine and Milling Machine Products

Send us your blue prints and samples of screw machine and milling machine products to figure on. We are equipped to give you the class of work you want, just when you want it, and at the right price. **J. Horat Company, 417-421 Ferry St., La Fayette, Ind.**

High Grade Machine Manufacturing

We are equipped to manufacture high grade specialties and intricate machines, such as typewriters, adding machines, etc. Can improve a defective design, producing a machine that will work and sell. We especially desire problems of this kind. Large facilities for small stampings. **Grand Rapids Brass Co., 66-90 Scribner Av., Grand Rapids, Mich.**

Tool and Die Work

Every kind, for which we have the machinery and skilled labor to produce results. We are equipped also for special machine work. Our particular specialty is high grade service. Can you use that kind? **Manhattan Brass Works, Grand Rapids, Mich.**

Stampings

Can you use any of our surplus stamping capacity? We would like outside orders and will make tempting prices. Facilities modern and first-class, and our products will stand rigid inspection. Let us show what we can do. Send samples, blue prints or specifications. **Hastings Mfg. Co., Hastings, Mich.**

We'll Make It—Your Metal or Wood Specialty

We have unusual facilities for producing specialties in both metal and wood. Experimental and model work, pattern making. Jigs, dies, sheet metal work. Write for details. **Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, New York City.**

Sheet Metal Stamping and Manufacturing

We solicit your inquiries for light sheet metal stamping and manufacturing of specialties. **O. D. Johnson Stamping Works, Batavia, N. Y.**

CONTRACT WORK WANTED

Tools—Dies—Jigs—General Machine Work

Screw machine products. Efficient service and prompt deliveries. Send us your blueprints for quotations. **Commercial Motor Car Co., Inc., Owego, Tioga County, N. Y.**

High-Grade Castings—Machine Building

High-grade castings in iron, brass, bronze and aluminum for machine shops and manufacturers. Well equipped machine and pattern shops. Machine work and machine building our specialty. Inquiries solicited. **Briggs-Shaffner Co., Shallowford St., Winston-Salem, N. C.**

General Machine Work—Dies, Tools—Special Machinery

We are equipped to build machines of every description—sheet metal punches and dies—tools, models and jigs—long brake dies. Our object is high grade service. Send b. p. for estimate. **Canton Machine Shop, 320 Rex Ave., Canton, Ohio.**

Light Milling, Drilling or Tapping Machine Work

We will be ready about July 1st to take on a large contract for the above class of work, as we have the machinery, labor, and all the necessary equipment to furnish the work at the right prices. We solicit offers. **The Burke Machine Tool Co., Conneaut, Ohio, U. S. A.**

Pressed Steel Shapes

With our heavy hydraulic presses, we can handle any pressed steel shapes using $\frac{1}{4}$ -in. stock or heavier at a very reasonable production cost. Our modern facilities also enable us to do plate or structural work upon a basis of close economy. Your inquiry is solicited. **Greenville Steel Car Co., Greenville, Pa.**

Machine Work, Welding, Brazing, Blacksmithing

I want machine work for screw cutting engine lathes, back geared drill presses, and shapers, also anything in brazing and welding, and first-class machine blacksmithing. Will make attractive prices on anything suitable for my equipment. **Wm J. Tighe, West Chester, Pa.**

Pressed and Stamped Steel Parts

It will pay you to let us figure on such pressed, stamped or drawn metal articles or parts as you may require, be they made of steel, aluminum, brass or copper. Our 15-acre plant at your disposal. Get the benefit of our "Knowing how since '81". Send samples or blue prints for estimate. **Geuder, Paeschke & Frey Co., Milwaukee, Wis., 1325-1700 St. Paul Av.**

Do You Want Contract Work?

If so, state in one of these spaces what you are prepared to do, and it will go into more manufacturing plants than if published in every mechanical journal in this country. The cost is low for a service covering metal-working plants of all kinds everywhere in the United States. **A. H. Hitchcock, Publisher, 1220-1235 Caxton Building, Chicago.**

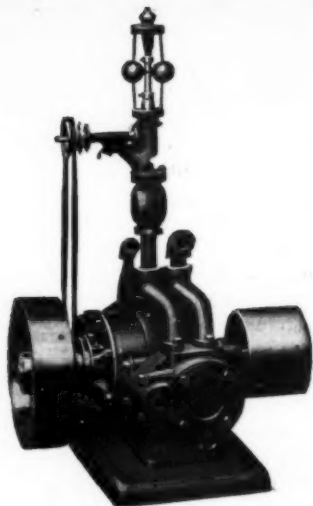
Want More Orders?

They are to be had for special contract work in machining, stamping, forging, casting, welding or any department of machine manufacturing. The problem is merely to bring the capacity and the demand for it together. If you have the idle capacity, and want work for it, the "Contract Work Wanted" department of the Tool List will help you to get in touch with machine-making plants everywhere in the United States. Its circulation among American metal working plants is country-wide. There is no other available means by which you can reach so many.

Don't let your equipment stand idle. That costs money—a lot more than it will cost you to find work for it. Write me for further information, and for a copy suggestion, which I shall be glad to make without cost or obligation.

A. H. Hitchcock, Publisher

Hitchcock's Machine Tool List
1220-1235 Caxton Building, Chicago, Ill.



Economical Portable Motor

Two Cylinder—Steam or Air

¶ While equal to an electric motor for quick work, it is much more economical when steam or compressed air is available. It's an ideal drive for our portable boring bars, valve seat planers, milling machines, etc., in railway and general repair shops. Accurately balanced, it runs up to 400 r. p. m. with very little vibration. An oil tight case encloses all working parts, making it dust and fool proof. ¶ As cost reducers our Portable Tools are second to none wherever they can be used. The line now includes:

Millers; circular planer tools; radius planers; rotary planers; machines for truing eccentrics, facing domes, arms for facing cylinder flanges; rotary flue cleaners; armature and axle bearing borers; pipe benders; locomotive cylinder borers; crank pin turners; reflex water glass grinders; rail saws; motors, etc.

Write for catalogue

H. B. Underwood & Company

1016-22 Buttonwood St., Philadelphia, Pa.

Second-Hand Machinery.

Lists of Second-Hand Machinery, either for sale or wanted, set in uniform style, will be published under this heading at the rate of **40 cents a line**, across the page, each issue. Minimum charge, **\$4.00**. Sub-headings are counted as one line, but the name and address of advertiser are not included in the space charged for. No display in this department.

Write directly to the parties offering the machines for sale for prices and full descriptions. If you do not find listed what you require, use the post card inclosed with each book to make known your wants to the publisher.

FOR SALE BY

The Cincinnati Ball Crank Co., - - - Oakley, Cincinnati O.
SCREW MACHINES.

Two Cleveland automatic old-style screw machines, 2" chuck capacity, 5-hole turret, complete in every respect. Can make immediate delivery.

FOR SALE BY

Potash, Care A. H. Hitchcock, 1220 Caxton Bldg., Chicago, Ill.
CHLORATE OF POTASH.

For sale at less than market price, one 112-pound keg of Chlorate of Potash Crystals, in original package.

FOR SALE BY

Coffin Valve Company, - - - Neponset, Boston, Mass.
TURRET LATHE.

One 22" Libby full swing side carriage turret lathe; excellent condition; including two motors and tools.

FOR SALE BY

E. O. Partridge, - - - 2041-2049 W. Lake St., Chicago
MILLING CUTTERS.

A number of high speed steel thread milling cutters—5, 6, 7 and 8 pitch, Acme thread (all new).

TWIST DRILLS.

Also a number of special long lengths, in letter and number sizes, high speed twist drills, (all new).

FOR SALE BY

Fred. C. Dickow, - - - 35 S. Desplaines St., Chicago, Ill.
LAHTES.

18x8 Sebastian-May, like new, \$ 325.	18x10 Putman, \$ 300.
26x10 Pond, raising blocks 36", 375.	Old 14" turret lathe, 75.

SHAPERS.

14" Hendey friction, good, \$ 120.	18" Cin. dbl. hd. traverse shaper
20" Juengst friction shaper, 185.	12" bed, weight 13000 lbs., cheap, \$400.

PUNCH AND SHEARS AND PRESSES.

L-10 Rock River, not geared, \$ 145.	No. 2 Ferracute, in A 1 cond., \$ 100.
L-10 Rock River, back geared, 175.	No. 1 Norton Bros., good, 60.

MISCELLANEOUS.

Bement vertical miller, power hacksaws, drill presses, air compressors, kick press, joiner, grinders, index centers, ball bearing internal grinders, etc.

SECOND-HAND MACHINERY

FOR SALE BY

New York Machinery Exchange,

50 Church St., New York City

All these Machines are in our Warehouses.

MILLING MACHINES.

Ingersoll, slab, platen 36"x12", 3 hds.
Ingersoll, slab, platen 12"x48".
No. 1-B Milwaukee plain.
Newton vertical, 48" circular table.
No. 5 Brown & Sharpe plain, vert.
att., working surf. of table 16"x34".
No. 3 Brown & Sharpe plain.
Brown & S. plain, table 14"x72".
No. 12 Brown & Sharpe mfg. miller.

No. 3 Cincinnati plain.
No. 1 Cincinnati plain.
No. 9 Kempsmith plain.
Newton plain, table 7"x34".
No. 1 Brainard, table 13"x46".
No. 4 Garvin profiler.
No. 3 Garvin plain.
No. 1 Pratt & Whitney plain.
No. 4 Garvin plain, table 9"x48".

TURRET LATHES AND SCREW MACHINES.

21" Gisholt turret.
24" Gisholt turret.
28" Gisholt turret.
41" Gisholt turret.
No. 5A Potter & Johnston turret.
2"x24" Jones & Lamson cone head
flat turrets.
48"x10" Bullard, friction head, back
geared turret.
48"x8" Bridgeport bk. geared turret.
32" Bridgeport turret, dbl. bk. grd.
Springfield boring lathe, 7" hol. spdl.
22" Garvin forming machine, wire
feed, 24" capacity.
Potter & Johnston hand screw ma-
chine, 18" capacity.
16" Pearson hand screw machine,
1 11-16" capacity.
16" Jones & Lamson hand screw
machine, 14" capacity.

30"x10" Morse turret, friction head.
Bardons & Oliver hand screw ma-
chine, 1" capacity.
Pratt & Whitney hand screw ma-
chine, 1" capacity.
Pratt & Whitney hand screw ma-
chine, 4" capacity.
No. 2 Garvin hand screw machine,
18" capacity.
No. 2 Garvin hand screw machines,
1 7-16" capacity, (5).
Pratt & Whitney hand screw ma-
chine, 7-16" capacity.
Warner & Swasey hand screw ma-
chine, 4" capacity.
2" Cleveland automatics, (3).
1 1/2" Cleveland automatics, (4).
1" Cleveland automatic.
1" Cleveland automatics, (3).
3" Brown & Sharpe auto., (2).

MISCELLANEOUS.

Bolt cutter, 14" Wells Bros.
Bolt cutter, 2" Merriman.
Bolt cutter, 34" Acme.
Boring machine, Bement-Miles hor-
izontal, 6" bar.
Boring mill, Ingersoll horiz., 8" bar.
Boring mill, Beaman & Smith 2-spin-
dle horizontal.
Boring mill, Detrick & H. horiz.
Boring mill, 37" Bridgeport verti-
cal, 2 heads.
Boring mill, 42" Bridgeport vertical.
Boring mill, 10" Farrel vertical.
Cold saw, No. 3 Newton comb.
Cut-off mch., 4 1/2" Hurlbut-Rogers.
Cut-off mch., double, Bement-Miles.
Drill, Foote-Burt heavy duty ad-
justable 2-spindle.
Drill, Baker Bros. Style F.
Gap stake riveter, 50" Bliss.
Gear cutter, 30" Gould & E.
Gear cutter, 36" Gould & E.
Gear cutter, 80" Bliss.
Grinder, No. 3 Landis universal.
Grinder, No. 2 Brown & S. univ.
Grinder, No. 1 Diamond, surface.
Grinders, duplex internal, No. 5
Bath, (2).
Grinder, gap, 12"x36" Landis plain.
Hammer, helve, 25 lb. Bradley.

Hammer, helve, 60 lb. Bradley.
Hammer, steam, 600 lb. Bement.
Hammer, steam, 1000 lb. Morgan.
Keyseater, No. 2 Mitts & Merrill.
Keyseater, No. 4 Mitts & Merrill.
Keyseater, No. 2 Baker Bros. Colburn
Keyseaters, No. 2 Davis, (2).
Pipe machine, 6" Curtis & Curtis.
Pipe machine, 8" Curtis & Curtis.
Pipe machine, 10" Curtis & Curtis.
Pipe machine, 8" Saunders.
Planer, Hilles & Jones, 16" plate.
Planer, 36"x36"x10" Pond.
Planer, 36"x30"x8" Powell.
Planer, 30"x30"x16" Harrington.
Press, double crank, b. g., No. 3
Bliss, 9,000 lbs.
Press, hydraulic, R. Hoe, 350-ton.
Punch & shear, No. 2 Hilles & J.
Radial drill, 4" Prentice plain.
Radial drill, 6" Bickford plain.
Shaper, 15" Ohio.
Shaper, 16" Hanover.
Shaper, 21" Hanover.
Shaper, 24" Walter Bros., geared.
Slotter, 12" Sellers.
Slotter, 14" Putnam.
Slotter, 17" Miles.
Tapping machine, 7" Baker Bros.
Tapping machine, 16" Baker Bros.

SECOND-HAND MACHINERY

FOR SALE BY

Prentiss Tool & Supply Co., New York, Boston, Buffalo, Syracuse.

BORING MILLS.

No. 5 C Newark horizontal.
62" vertical, 2 heads.
8" Niles, 2 heads.

2-spindle Beaman & Smith horiz.
5" bar Beaman & Smith horizontal.
No. 1 Springfield spindle borer.

DRILLING MACHINES.

1-sp. Barr sensitive.
3-spindle Woodward & Rogers.
5-spindle Reed.
4-spindle Barr.
22" Aurora, sliding head.
28" Snyder, sliding head.

31" Bickford radial.
8" American radial.
4" Universal radial.
6-spindle Gardam, adjustable.
12-spindle Gardam, adjustable.

GRINDERS.

No. 1 Brown & Sharpe, internal.
Esen-Lucas saw grinder.

No. 60 Heald, cylinder.
3" Yankee, twist drill.

LATHES.

11" x 5' Prentice Bros.
14" x 6' Blaisdell, elevating rest.
14" x 6' Lodge & Shipley, taper.
16" x 6' Reed.
18" x 8' Rahn-Carpenter.

20" x 10' LeBlond.
20" x 8' Lodge & Davis, plain rest.
22" x 10' Bogart.
42" x 16" Niles.
16" x 6" automatic threading.

MILLING MACHINES.

No. 3 Kempsmith, plain.
No. 1 Van Norman, duplex.

No. 2 Becker, vertical.
No. 5 Becker, vertical, rotary table.

PLANERS.

24" x 24" x 8' Pratt & Whitney.
26" x 26" x 6' Draper.
26" x 26" x 6' Whitcomb.

30" x 30" x 8' Gray.
37" x 37" x 8' Gleason.
52" x 42" x 12' Powell.

PRESSES.

P-2 Ferracute press.

No. 52 V. & O.

PUNCHES AND SHEARS.

No. 6 Hilles & Jones shear.
25" Weiss & Roos.

10" Bement, 1" x 1".
18" Perkins.

SAWS.

4" Esen-Lucas.
No. 11 Higley.

Robertson, power hack.
No. 1M Q. & C. power.

SHAPERS.

9" Pratt & Whitney.
14" Chase, crank.
15" Juengst, friction.

18" Prentiss, crank.
30" Kelley, crank.
24" Hendey.

SCREW MACHINES.

No. 2 Brown & Sharpe, wire feed.
18" x 6" Rivett heavy monitor.
12" Gisholt.
18" x 7" Fay & Scott.

31" Cleveland auto.
14" Hartford auto.
3" National-Acme.

MISCELLANEOUS.

Air compressor, 8" x 8" American.
Blower, pressure, No. 4 American.
Broaching machines, Nos. 2, 3 and 4
LaPointe.
Bolt cutter, 1 1/2" Reliance.
Cutting-off machine, 3" Davis.

Gear cutter, 64x16 G. & E.
Gear cutter, No. 1 Whiton.
Shear, No. 6 Hilles & Jones.
Slotter, 12" Betts.
Tapper, 4" Baker Bros.

SECOND-HAND MACHINERY

FOR SALE BY

Badger-Packard Mchy. Co., 72-74-76 W. Water St., Milwaukee, Wis.

DRILLING MACHINES.

20" Barnes, geared.
3-sp. Henry & Wright, ball bear'g(2).

3-spindle Fox.
3-spindle Sigourney.

LATHES.

14"x6' Wood & Light, r. and f. rest.
15"x8' Blaisdell, compound rest.

21"x18' Pond, compound rest, c. s.
No. 324 Toledo spinning lathe.

MISCELLANEOUS.

Air compressor, 10x10 Franklin, complete with tanks and fittings.
Buffing lathe, No. 10 Hanson-Van Winkle.
Grinder, disc, No. 3 Bealy.
Hack saw, No. 1 Q. & C.

Hack saw, Hoefer.
Homing presses, No. 21 Consol., (6).
Miller, No. 34 Fox, with c. s.
Punch press, No. 3 Rockford, o. b. i.
Punch press, No. 3 Stiles.
Punch & shear, No. 52 S. M. & W.

FOR SALE BY

A. D. White Machinery Co., 108-114 N. Jefferson St., Chicago

SCREW MACHINES.

5-16" Lavigne.
7-16" Cleveland, friction fd.
1" Cleveland, friction fd.
1-1/2" Cleveland, friction fd.
1-1/2" Cleveland, jigger feed.
1" Hartford, (2).

1" Cleveland, friction jigger feed.
1" Lavigne, (4).
2" Hartford.
2-1/2" Hartford.
1" Cleveland, semi-automatic.
1-1/2" Dreses, hand, grd. fr. hd.

ENGINE LATHES.

13"x5' Pratt & Whitney.
16"x6' LeBlond.
16"x12' Beaman & Smith.
18"x8' Fitchburg.

18"x8' Peerless.
24"x10' Putnam, (2).
28"x12' Fifield.
30"x14' Blaisdell.

DRILL PRESSES.

14" Mechanics.
20" Barnes.
24" Hoefer, stat. head.
28" Barnes, sliding head.
28" Bickford, sliding head.
30" Kerkhoff, sliding head.

32" Bickford, sliding head.
34" Barnes, sliding head.
36" Bickford plain radial.
8 spd. Valley City mult., No. 2 taper.
10 spindle Pratt & W. multiple.
12 spd. Baush multiple, No. 2 taper.

PLANERS AND SHAPERS.

24"x24"x8' Powell, 1 head.
32"x32"x8' Betts, 1 head.
35"x35"x12' Niles, 2 heads.

16" Smith & Mills.
20" Smith & Mills.
24" Gould & Eberhardt.

PUNCH PRESSES.

No. 1 Toledo, o. b. i.
No. 2 Ferracute, o. b. i.
Nos. 2 & 4 Adriance, o. b. i., (2 each).
No. 18-C Bliss, o. b. i.
No. 4 McDonald, o. b. i.
No. 120 Crosby, o. b. i.
No. 16 Wold press.

Nos. 19 and 30 Crosby, open back.
Nos. 40 and 45 Crosby, open back.
No. 66 Crosby arch press.
Walsh arch press.
No. 18 Bliss horn press.
King power forcing press.
150-ton, 36" Sellers wheel press.

GRINDING MACHINES.

No. 3 Landis universal, (3).
18" Ransom, disc.
Yankee Style "B" drill grinder.
3-spdl. valve grinder.
No. 6 Diamond floor grinder.

14" Norton floor grinders, (2).
14" Bridgeport floor grinders, (2).
2" Webster & Perks floor grinder.
Springfield dbl. wheel water grinder.
No. 2 Leland & F. water grinder.

MISCELLANEOUS.

Bolt cutters, 1 1/2" & 3" National, s. hd.
Boring machine, 3 1/2" bar, Binsse.
Boring mill, 42" Dawson, sgl. hd.
Gear cutter, 18" Gould & Eberhardt.
Hammers, 40 & 60 lb. Bradley, cu. hlv.
Keyseaters, 18" & 36" Morton, port.
Miller, No. 34 Brown & Sharpe, pl.

Oil gas generator, No. 3 American.
Pipe machine, 2" Jarecki.
Punch, Rock River rapid action.
Riveter, 3-16" Adt.
Saw sharpener, Nutter-Barnes.
Shear, No. 136 Niagara, pwr. sq. 18 g.
Shear, No. 380 Toledo, slitting 16 g.

SECOND-HAND MACHINERY

FOR SALE BY

Federal Machinery Sales Company, 14 N. Jefferson St., Chicago

DRILLING MACHINES.

- 2-spindle Henry & Wright high-speed ball-bearing drill.
- 20" Davis, stationary head, complete with back gears and power feed.
- 20" Kern, stationary head, wheel and lever and power feed, no back gears.
- 21" Prentice, stationary head, square base, belt power feed, no back gears.
- 23" W. F. & John Barnes, stationary head, back gears and power feed.
- 18" Silver post drill, round table, lever feed.
- 24" No. 16 Canedy-Otto post drill, hand and ratchet power feed, square table.

GRINDERS.

- No. 1 Cincinnati plain cutter and tool grinder.
- No. 38 Safety Emery Wheel plow grinder, 3" spindle.
- No. 39 Safety Emery Wheel grinders, 2" spindle, (2)
- 8" Heald ring and surface grinder, power feed, magnetic chuck.

LATHES.

- 16"x8' Blaisdell engine lathe.
- 17 1/2"x8' Prentice engine lathe, compound rest, power cross feed, hollow spindle.
- 18"x6' New Haven engine lathe, four-step cone, hollow spindle, comp. rest.
- Five new 20"x10' new Keed engine lathes, five-step cone, single back gears, hollow spindle, compound rest.
- 22"x8' Blaisdell engine lathe, three-step cone, double back gears, taper attachment, hollow spindle, heavy duty.
- 27"x12' New Haven, with raising blocks to swing 48", five-step cone, 4" belt, hollow spindle, compound rest.

SCREW MACHINES AND TURRET LATHES.

- 14" Drees friction head screw machine, power feed to turret.
- 1 1/2" Acme Cincinnati screw machine, friction head, power feed, (new).

MILLING MACHINES.

- Pratt & Whitney small plain miller, two-step cone, 3" belt, not back geared.
- Brown & Sharpe No. 1 universal miller, four-step cone, with all attachments, not back geared.
- No. 2 Davis & Egan back geared plain milling machine.

PLANERS.

- 18"x18"x4' Putnam planer.
- 22"x22"x4' Pond Planer, with one head on cross rail.
- 30"x30"x8' New Haven, one head on cross rail.

SHAPERS.

- 10" Pratt & Whitney, plain crank.
- 15" Lodge & Davis, plain crank.
- 16" Cincinnati, plain crank.
- 16" Smith & Mills, back geared.

MOTORS.

- All 220 Volts, 60 Cycle, 2 Phase, Westinghouse.
- One—40 h. p., 850 r. p. m.
- One—20 h. p., 1750 r. p. m.
- One—25 h. p., 1150 r. p. m.
- One—15 h. p., 1750 r. p. m.

FORGING AND MISCELLANEOUS MACHINERY.

- Bench press, on column.
- Bit crimping or forging machines, Waterbury, (2).
- Blower, single steel plate, 60" Buffalo.
- Blower, 24" Buffalo, and countershaft.
- Exhaust fan, steel plate, Buffalo, 40" fan, 24" exhaust.
- Gas furnace, Stewart combination.
- Hammer, board-lift drop, 400-lb. Pratt & Whitney.
- Hammer, upright strap, 50-lb. Bradley.
- Hammers, horizontal helve, 60-lb. Bradley, (2).
- Hammer, horizontal helve, 80-lb. Bradley.
- Hammer, upright strap, 100-lb. Bradley.
- Hammers, upright compact, 125-lb. Bradley, (2).
- Hammers, upright compact, 200-lb. Bradley, (2).
- Hammers, belt lift drop, Williams & White, second-hand, (2).
- Heading, upsetting and forging machine, 1" Acme.
- Heading, upsetting and forging machine, 1 1/2" Acme.
- Polishing jacks, heavy, (21).
- Rivet hammer.
- Shear, geared alligator, 5" blade.
- Shears, small geared power, 6" blades, (2).
- Taper rolls, No. 2 Coulter & Mackenzie, heavy geared, 1 set.

SECOND-HAND MACHINERY

FOR SALE BY

The Machinery Warehouse, 3705 S. Ashland Ave., Chicago, Ill.

60" Morton.

36"x36"x16' Sellers, 1 head.

15"x5' Porter.

18"x6' Ames.

18"x6' Lodge & Davis.

SHAPERS.

14" Steptoe.

PLANERS.

54"x34"x21' Sellers, 3 heads.

LATHES.

21"x8' Putnam.

21"x104' Lodge & Davis.

28"x154' Prentice.

All the above tools are in guaranteed condition. Lathes have hollow spindles, compound carriages and full equipment.

FOR SALE BY

McCoy-Brandt Machinery Company

Office and Warehouse 216-218 Penn Ave., Pittsburgh, Pa.

LATHES.

36"x12' Davis, c. r., h. s., (heavy).

20"x 8' Porter, p. r., s. s.

18"x 8' L. & S., patent head, q. c.

18"x 8' Fay & Scott, h. s., c. r.

18"x4'6" American, q. c., h. s., c. r.

16"x 8' L. & S., q. c., h. s., c. r.

16"x 8' Davis, p. r., h. s.

16"x 6' Reed, p. r., s. s.

15"x 8' Johnson, c. r., s. s.

12"x 5' Davis, c. r., h. s.

PLANERS.

16"x16"x 3' Pratt & Whitney.

22"x22"x 5' New Haven.

24"x24"x 8' Lodge & Davis (heavy).

30"x24"x10'6" Niles-Bement.

36"x12' D. & H., open side.

HAMMERS.

75 lb. Bradley, upright strap.

75 lb. Modern, power.

100 lb. Rochester, helve.

300 lb. Johnston & Jennings.

Nos. 1, 2 and 3 Nazel, power.

1000, 1200, 3000 lb. board drop.

CRANES, ELECTRIC TRAVELING.

90-ton (ladle) 220 v., 48'9" span.

20-ton, 220 v., d. c., 39' span.

15-ton, 220 v., d. c., 35' span.

12-ton, 220 v., d. c., 50' & 70' spans.

10-ton, 220 v., d. c., 28' & 39' spans.

8-ton, 220 v., d. c., 25'4" & 39' spans.

5-ton, 220 v., d. c., 33' & 42' spans.

5-ton, 220 v., d. c., 25'4" & 31' spans.

5-ton, 220 v., d. c., 40' span.

2-ton, 220 v., d. c., 25' span.

MISCELLANEOUS.

Bending rolls, 20' long, wt. 100,000 lb.

Boiler, 40 h. p., ret. tub., 60' stack.

Bulldozers, Nos. 1, 2, 3, 4 and 12.

Boring mill, 100' Poole, 2 heads.

Compressor, 10x12x10", Laidlaw.

Die cutter, (auto.) cap. 8" dies.

Drill presses, 20" & 28" sliding hd.

Gang punch, 72" cap. 4", 20,000 lb.

Gas engine, 30 h. p., 2 cyl., vertical.

Generators, 3, 224, 25, 75 k.w., 110 v.

Generator, 30 k.w., 125v., d.c., st. eng.

Hoist, d.c., s. d., rev., 8x10" vert.

Keyseater, No. 2 Davis.

Motors, 5, 6, 30 h. p., 110 v., d. c.

Motor, 100 h. p., 220 v., d.c., 780 r.p.m.

Motors, 10 and 55 h. p., 500 v., d. c.

Pipe machines, 2, 4, 6, 8, 10 and 12".

Press, straight sided, auto. roll feed.

Presses, equal No. 19 Bliss, o. b. i.

Press, drawing, 28" stroke, 400 ton.

Press, blanking, 31" stroke, 160 ton.

Punch & shear (sgl.) 48" cap. 4x1"

Punch & shear (double) 28 & 12"

throats, punch 31x2", shear 10x2"

Shear, Lennox No. 2, rotary bevel.

Shear, squaring, 108", 8 ga., geared.

Shear, alligator, 14" cap., 9" knife.

Shear, butterfly, 8" knives.

Straightening rolls, No. 0 Hilles &

Jones, 56"

Turret, 16" Springfield Monitor,

full universal.

Good condition — Quick shipments.

WANTED BY

Bertsch & Company.

Cambridge City, Ind.

SHAPER.

We want a long-stroke traveling head shaper, any length.

SECOND-HAND MACHINERY

FOR SALE BY

The Strong, Carlisle & Hammond Co., Cleveland, O., Detroit, Mich.

ENGINE LATHES.

- | | |
|-------------------------------------|--|
| 14"x6' Blaisdell, c. r. | 18"x6' Fitchburg, c. r. |
| 14"x6' Reed, r. & f. rest, (2). | 20"x6' New Haven, c. r. |
| 14"x6' Blaisdell, p. r. | 28"x8' New Haven, c. r. |
| 16"x6' Blaisdell, c. r. & t. a. | 20"x8' Walcott & Wood, c. r., 3 s. c., |
| 16"x8' Blaisdell, c. r. & t. a. | double back geared. |
| 14"x6' Hendey, r. & f. rest. | 28"x12' Lodge & Davis, c. r. |
| 17"x8' Perkins, c. r. | 38"x16' Fifield, c. r., s. s. |
| 16"x6' Lathe & Morse, r. & f. rest. | |

FOX LATHES.

- | | |
|---|---------------------------------|
| 14"x6', sq. arbor, s-o, tailstock, (2). | 20" American, universal turret. |
|---|---------------------------------|

TURRET LATHES.

- | | |
|---|-------------------------------------|
| 18" Lodge & D., g. f. hd., auto chuck. | 1" Wells, plain head. |
| No. 7 Bardons & Oliver, g. f. hd., | No. 4 W. & S., g. f. hd., p. b. |
| with vert. forming attachment. | 12" Warner & Swasey, p. b. |
| No. 4 B. & O., g. f. hd., with p. b. & p. | No. 2 Bardons & Oliver, plain head, |
| 14" Lodge & Davis, plain head. | with p. b. |

MILLING MACHINES.

- | | |
|-------------------------------|--------------------------------------|
| No. 8 Brainard, Lincoln type. | No. 12 Brown & Sharpe, plain. |
| No. 15 Garvin. | No. 6 Whitney, with v. s. attachment |
| No. 6 Whitney. | Garvin hand miller. |

UPRIGHT DRILLS.

- | | |
|--------------------------------------|--------------------------------|
| 20", w. & l. fd., s. b., (4). | 20" b. g. & p. f., s. b., (4). |
| 20" b. g. & p. f., s. b., with t. a. | 24" b. g., p. f., sliding hd. |
| Sensitive drills, (6). | |

MULTIPLE DRILLS.

- | | |
|---------------------------------|------------------------------------|
| Bausch 12-spindle, 1" capacity. | Pratt & Whitney, 12-spindle. |
| 3, 4 and 6-spindle sensitive. | Detroit 5-spdl. horiz., semi-auto. |

GEAR CUTTERS.

- | | |
|------------------------------|------------------------------------|
| 30" Brainard semi-automatic. | 36" Gould & Eberhardt, auto. spur. |
|------------------------------|------------------------------------|

PLANERS.

- | | |
|------------------------|----------------------------------|
| 24"x24"x5' Pond, spur. | 30"x20"x12' Cleveland open side, |
| 26"x26"x6' Kidd, spur. | one rail and one side head. |
| 20"x20"x3', spur. | |

PUNCH PRESSES.

- | | |
|---------------------------------|------------------------------|
| No. 18 Bliss pl. inclinable. | No. 22 Danielson inclinable. |
| No. 018 Bliss bench inclinable. | No. 23 Toledo, (2). |
| No. 22 foot power presses, (3). | |

BORING MILLS.

- | | |
|--------------------------------------|---------------------------------------|
| 60" Industrial, sgle. hd., vertical. | 36" Barrett, horizontal, with 5" bar. |
|--------------------------------------|---------------------------------------|

24" Binsse, pl. hd., horizontal.

GRINDERS.

- | | |
|--------------------------------|------------------------------|
| Warner & Swasey cock grinders. | 14" & 20" wet grinders, (5). |
|--------------------------------|------------------------------|

No. 60 Heald, cylinder.

SHAPERS.

- | | |
|--------------------------------|------------------------|
| 16" Fitchburg, traveling head. | 18" Walcott, geared. |
| 20" Hendey, friction. | 20" Walcott, friction. |

SCREW MACHINES.

- | | |
|----------------------------------|--------------------------------|
| 14" Cleveland automatic, 3-hole. | 2" Hartford automatic, 5-hole. |
| 2" Cleveland automatic, 5-hole. | |

MISCELLANEOUS.

- | | |
|--------------------------------------|---|
| Bending roll, 10x20" Bertsch, heavy, | Profilor, No. 2 Garvin, 2 spindle, |
| triple geared. | Wesson drive. |
| Bolt cutter, 14" Acme, single head. | Pulley lathe, 36" Stevens, with bor- |
| Bolt cutter, 14" Wells, single head. | ing attachment. |
| Cold saws, 12" Burke, (2). | Radial, 4' arm Prentice, with spd. box. |
| Grinder, 16x50" Springfield, planer | Radial, 5' arm Bickford, speed box, |
| type. | single pulley drive. |
| Keyseater, Morton, draw stroke. | Radial, 6' arm Cleveland P. & S. |
| Pipe machine, 2" Jarecki. | Works, wall type. |
| Pipe machine, 4" Williams. | Saw, 7" No. 5 Cochrane-Bly. |
| Pipe machine, 6" Curtis & Curtis. | Saw, No. 20 Lea-Simplex, new. |

SECOND-HAND MACHINERY

FOR SALE BY

Girard Machine & Tool Co., 491-493 N. Third St., Philadelphia, Pa.

LATHES.

24"x10' New Haven, c. r.	16"x 8' Porter, hollow spindle.
21"x 8' Wood Light, r. f. r.	14"x 6' Prentice Bros., hol. spindle.
18"x 8' Willetts, c. r.	14"x 6' Lodge & Shipley, hol. spdl.
16"x 8' Johnson, solid spindle.	10"x 4' Gould, solid spindle.

MISCELLANEOUS.

Boring mills, turret head vertical, 36" Brown & Sharpe, (2).
 Boring and turning mill, 7' Hilles & Jones.
 Broaching machine, No. 2 Lapointe.
 Cold cutting-off saws, capacities 4", 5" and 6" round.
 Grinder, combination disc, No. 14 Gardner.
 Hammer, steam drop, 600-lb. Bement, 6 1/2" diam., 30" stroke.
 Milling machine, No. 1 Brainard back geared, plain, table 10"x44".
 Pipe cutting and threading machines, 4" and 6".
 Planer, 40"x40"x12' New Haven, with one head.
 Radial drill, 32" Harrington.
 Shaper, 18" Cincinnati, double head, with two tables on 12' bed.
 Slab miller, 17"x8' Beaman & Smith, with two horizontal spindles.
 Stamping and punching presses, a large number of the open back inclinable, straight side and arch types.
 Turret lathes, large stock of various sizes and makes.

FOR SALE BY

Simmons Machine Co., Inc., 981-985 Broadway, Albany, N. Y.

New York Office, 902 Singer Building

Machinery for Immediate Delivery.

NEW.

Grinders, cutter reamer, No. 6 Universal, (10).	Lathes, 13x6 South Bend, (10).
Lathes, 14x8 Monarch, qck. chg. gr.	Millers, No. 2 Kempsmith univ., (2).
Lathes, 18x8 Cisco, qck. chg. gr., (5).	Millers, No. 1 Kempsmith plain.
Lathe, 19-38x10 Le Blond high duty, motor drive.	Millers, No. 2 Kempsmith plain.
Lathe, 18x8 Sidney, q. c. g., d. b. g.	Miller, No. 1 1/2 American, plain.
Lathes, 14x6 Seneca Falls, tool room, (10).	Planer, 24x24x6 Cincinnati high duty, motor drive.
	Shaper, 16" American high duty, motor drive.

USED.

Bolt cutter, 2" Acme.	Lathe, 34x22 New Haven.
Boring mill, 52" Bement-Niles, (1).	Lathe, 40x16 Harris.
Boring, 60" Bement-Miles, horiz.	Lathe, 60x10 New Haven, boring and facing.
Cutting-off mch, 3" Hurlbut-Kogers.	Lathe, 66x16 Pond, hollow spindle, compound rest, 4 1/2" hole.
Drill press, 25" Sibley upright.	Lathe, 20x7 Reed, compound rest.
Drill press, 24" Barnes, sliding hd.	Lathe, Fox, 16x36 American.
Drill press, 20" Barnes, sliding hd.	Millers, Garvin duplex, (2).
Drill press, No. 28 Canedy-Otto.	Miller, Ingersoll, slab.
Drill press, No. 51 Canedy-O, radial.	Millers, No. 7 Becker-Brainard, (2).
Gear cutter, 48" Gould-Eberhardt.	Miller, No. 284 Bement, Lincoln type.
Grinder, Iroquois universal.	Miller, No. 1 Steptoe, hand.
Grinder, Brown & Sharpe, cutter and reamer.	Miller, No. 6 1/2 Brainard, Lincoln.
Grinder, Springfield, wet.	Planer, 20x20x5 Putnam.
Lathe, 16x10 Flatther, comp. rest.	Planer, 36x36x12 New Haven.
Lathe, 20x10 American, qck. chg.	Planer, 42x42x10 Powell, 2 heads.
Lathe, 20x8 Bullard turret.	Planer, 84x84x12 Pond, 2 heads.
Lathe, 20x8 Pond, h. s., c. r.	Punch and shears.
Lathe, 22x12 Fifield, comp. rest.	Shaper, 16" Juengst.
Lathe, 22x12 American, qck. chg.	Slotter, 15" Bement.
Lathe, 34x10 New Haven.	Trip hammer, Merrill.
Lathe, 28x20 New York Steam B.Co.	Turret lathe, 17-32" Pratt & W.
Lathe, 30x16 New Haven.	

SECOND-HAND MACHINERY

FOR SALE BY

The H. A. Stocker Machinery Co., 566-72 W. Randolph St., Chicago

TURRET LATHES.

- | | |
|----------------------------------|--|
| 12" Windsor, plain head. | 34" Garvin turret boring lathe, back geared. |
| 16" Lodge & Shipley, plain head. | 28" Gisholt with taper attachment. |
| No. 2 Warner & Swasey hol. hex. | 3x36 Jones & Lamson. |
| 24" Niles, friction head. | |
| 16" Foster, ring turret. | |

ENGINE LATHES.

- | | |
|-------------------------------------|----------------------------------|
| 14"x 6' Davis, q. c. g. | 18"x12' American, q. c. g. |
| 14"x 6' Fairbanks, c. r. and taper. | 18"x12' Greaves & Klusman, c. r. |
| 14"x 6' Prentice, c. r. | 20"x10' Flather, c. r. |
| 16"x 6' Robbins, c. r. | 21"x12' Bradford, c. r. |
| 16"x 6' Sebastian, p. r. | 21"x12' New Haven, c. r. |
| 16"x 8' Lodge & Shipley, pat. head. | 24"x40"x12' McCabe, 2-spindle. |
| 16"x10' Greaves & Klusman, c. r. | 24"x16' Schumacher & Boye, c. r. |
| 18"x 6' Bradford, c. r. | 32"x12' Pond, c. r. |
| 18"x 8' Lodge & Shipley, pat. head. | 32"x18' Rahn-Larmon. |
| 18"x10' Bradford, c. r. and taper. | 36"x12' Hamilton, c. r. |
| 18"x12' Barker, c. r. | 42"x28' American, triple gear. |

SCREW MACHINES.

- | | |
|-------------------------------------|--------------------------|
| Pratt & Whitney No. 1, frict. gear. | No. 11 Garvin, hand. |
| 3-16" Hartford automatic. | 24" Cleveland automatic. |
| 2" Cleveland automatic. | |

BORING MILLS.

- | | |
|---------------------------------|--|
| 52" Niles, car wheel. | 51" Bullard, two swivel heads, with motor drive and motor. |
| 48" Colburn, two heads. | 72" Colburn, vertical, 2 heads. |
| 60" Colburn, vertical, 2 heads. | |

PLANERS.

- | | |
|------------------------------------|--|
| Morton portable. | 36"x36"x10' Powell, one head. |
| 17"x17"x12' Whitcomb, crank. | 36"x36"x12' Powell, two heads. |
| 22"x22"x 6' Gray, one head. | 36"x36"x12' Sellers, one head. |
| 24"x24"x 4' New Haven, one head. | 36"x36"x12' Cincinnati, two heads. |
| 24"x24"x 6' Pond, one head. | 39"x39"x12' New Haven, one head. |
| 24"x24"x 6' Gray, one head. | 54"x54"x14' Pond, two heads, arranged for motor drive. |
| 30"x30"x12' Cincinnati, two heads. | |

MILLING MACHINES.

- | | |
|------------------------------|-------------------------------|
| No. 12 B. & S. plain. | No. 23 Fox miller. |
| No. 2 Cincinnati plain. | No. 13 P. & W., Lincoln type. |
| No. 3 P. & W., Lincoln type. | Garvin No. 14 universal. |

GEAR CUTTERS.

- | | |
|---|---|
| 16" Gould & Eberhardt automatic. | 24"x9" Gould & Eberhardt, for spur, bevel and face gears. |
| 24"x7" Gould & Eberhardt, for spur gears. | 36"x10" Gould & Eberhardt auto. |

SHAPERS.

- | | |
|-------------------------|----------------------------------|
| 15" Hendey, friction. | 18" Barker & Chard, back geared. |
| 16" Niles, back geared. | 20" Davis & Egan. |

HAMMERS.

- | | |
|---|--------------------------------------|
| 100 lb. American, steam post. | 300 lb. Bliss, drop. |
| 100 lb. Pittsburg, single frame, steam. | 800 lb. Morgan, single frame, steam. |
| 200 lb. Bliss, drop. | 3000 lb. Toledo, drop. |

PRESSES.

- | | |
|--|-----------------------------------|
| No. 77-A Toledo, o. b., straight side. | No. 430 McDonald, double crank. |
| No. 1 Mossberg & Granville. | No. 133 Ferracute, double action. |
| No. 3 Toledo, o. b. | No. 95 Bliss, double crank. |

DRILLS.

- | | |
|----------------------------------|----------------------------|
| 5' Dreses full universal radial. | 24' Dreses radial. |
| 3' Economic plain radial. | No. 30-C Baush 12-spindle. |

SECOND-HAND MACHINERY

FOR SALE BY

Herman L. Winterer,

908-910 Beach St., Philadelphia, Pa.

ENGINE LATHES.

48"x33' Bement.
44"x12' Niles-Bement-Pond, double,
compound rest, quick change gear.
39"x26' New Haven.
40"x16' American, compound rest.

38"x18' Lodge & Davis.

26"x21' Bement.

24"x12' Flather.

And many other lathes of smaller sizes.

TURRET LATHES.

14" Jones & Lamson, chucking.

24"x24" Jones & Lamson, flat.

4"x28" Niles-Bement-Pond "Milwaukee", rigid.

60"x10' Henley.

37"x10' Lodge & S., b. g., 5" h. s.

30"x 5' Lodge & S., b. g., 2 1/2" h. s.

24"x 8' Blaisdell.

DRILL PRESSES.

42" Bement radial.

39" Gang radial.

40" Bement-Miles.

30" Bement.

24" drills, several.

Baker high speed, (2).

MISCELLANEOUS.

Bolt cutter, 1 1/2" Acme, single head.

Bolt cutter, 1 1/2" National, sgl. head.

Bolt cutter, 3" Acme, single head.

Bolt cutter, 1 1/2" National, dbl. head.

Boring and turning mill, 42" Bullard, rapid production.

Large assortment of Boilermakers' and General Machinery.

Send for complete list.

Planer, 24"x6' Fitchburg.

Planer, 24"x8' Fitchburg.

Planer, 25"x10' Fitchburg.

Press, No. 54 Bliss.

Slab miller, 16"x4 1/2' Newton.

Slab miller, 20"x 4 1/2' Franklin.

FOR SALE BY

Co-operative Used Machinery Company,

50 Church St., Suite 482,

(Phone Cortlandt 665),

New York

Warehouse, 408 Claremont Ave., Jersey City, N. J.

GRINDERS.

Landis, plain cylindrical, cap. 8x42".....\$1400

Two (2) Landis, plain cylindrical, cap. 7"x36", each.....1250

Brown & Sharpe universal, cap. 12"x30".....1400

Two (2) Brown & Sharpe universal, cap. 12"x36", each.....1400

AUTOMATIC SCREW MACHINES.

Three (3) Gridley single spindle, cap. 2 1/2" motor driven, motors wound for 220 volts, d. c. (2 motors), each.....\$1500

Hartford, 2 1/2" capacity.....850

Hartford, 1 1/2" capacity.....750

LATHES.

52"x16' Gleason.....\$2500

50"x20' Fidelity.....3000

42"x12 1/2' Wood Light.....1000

30"x15' Lodge & Shipley, taper.....2200

24"x18' Lodge & Shipley, qk. chg. gr., taper, motor driven, with motor, 2150

14"x 6' Hendey, quick change.....800

RADIAL DRILLS.

5' Pond.....\$ 750

5' Baush, heavy duty.....950

3' Baush.....500

HYDRAULIC PRESS.

3000-ton Bethlehem Steel Co.'s hydraulic press.

PLANERS.

72"x72"x11' Fitchburg, 2 heads on rail.....\$1500

Two (2) 36x36 Powell steel foundry, 2 heads, fitted for motor drive.....1250

Gleason, extension housing, 54" wide, 32" high, 16' bed, 2 heads.....1500

HORIZONTAL BORING MILLS.

Espen-Lucas floor boring & facing mch., 4" bar, bores to center of 70".....\$2000

Espen-Lucas boring and facing machine, 4" bar, bores to center of 12".....3750

In addition to the above we have a very large stock of every kind of Machine Tool and Metal Working Machinery.

SECOND-HAND MACHINERY

FOR SALE BY

Marshall & Huschart Machinery Company,
17 S. Jefferson St., Chicago - 915 Chemical Bldg., St. Louis

BOLT CUTTERS.

No. 2 Adams, $\frac{1}{2}$ " capacity.
1" National, double head.

No. 4 Detrick & Harvey double
head nipple, capacity $\frac{1}{2}$ " to $1\frac{1}{2}$ ".

BORING MACHINES.

Barrett cylinder borer, 6" bar.
42" Bullard vertical rapid produc-
tion, one swivel, one turret head,
quick power traverse.

33" Niles car wheel borer.
36" Niles car wheel borer.
7-10' Betts extension mill, two rail
heads, one boring hd., one side hd.

CENTERING MACHINES.

13" Whiton.

DRILLING MACHINES.

20" Barnes, stationary head.
20" Mechanics, friction.
20" Rockford, back geared.
34" Niles semi-universal radial.

4 $\frac{1}{2}$ ' arm Alfred Box plain radial.
5' arm universal radial.
5' Prentice plain radial, cone drive,
gear feed.

GEAR CUTTERS.

6" Bilgrim bevel gear planer.
30" Gould & Eberhardt, for spurs
and bevel, with rack cutting att.

18"x4" Brainard spur gear cutter.
Norris four-spindle multiple-bevel
gear roughing machine.

GRINDERS.

Safety Emery Wheel Co., wet.

12"x72" Norton plain.

KEYSEATERS.

Lapointe No. 2 Broaching machine.

ENGINE LATHES.

18"x14" Lodge & Davis, compound
rest, chuck.
24"x10" American, power feed to tur-
ret on bed.
24"x10" Peerless, compound rest,
four step cone.
24"x12" Fifield, compound rest.

24"x16" New Haven, four step cone.
26"x13" Pond, compound rest.
36"x14" Putnam, compound rest.
10" Reed speed lathe.
13"x6" Blount speed lathe.
4" Sterling polishing lathe.

MILLING MACHINES.

No. 44 Brainard plain, with vertical head.
30"x10" Ingersoll slab miller.

PIPE MACHINES.

2" Jarecki, with 5 sets of dies.

2" Murchey.

PLANERS.

24"x24"x6" McFarland & Nottingham.
30"x30"x6" Pond, one head.

PRESSES.

No. 5 Greenerd arbor press.

PUNCHES AND SHEARS.

Lennox No. 1 hand slitting shear.

Lennox No. 12 hand punch, 12" thr.

SAWS.

West Haven power hack saw.
No. 1 Q. & C. hack saw.

Williamson band saw.

SCREW MACHINES.

1" Pratt & Whitney hand screw
machine.

1 $\frac{1}{2}$ " American hand screw machine.
1 $\frac{1}{2}$ " Pearson hand screw machine.

SHAPERS.

16" Baker Brothers draw stroke
shaper, new.
17" Juengst.
18" Smith & Silk, with vice and c. s.

18" Lodge & Davis, geared shifting
belt.
26" Walcott, actual stroke 28", shift-
ing belt.

SLOTTER.

Baker Brothers 20" draw stroke slotter, full automatic feeds.

SECOND-HAND MACHINERY

FOR SALE BY

The Bicknell Mfg. & Supply Co.

Janesville, Wis.

Automatics, 1" to 2" Cleveland, (16).
Automatics, 1-16 to 24" Hartford, (11).
Arbor press, power, 12".
Boring mill, 100", 72" table, 2 heads.
Boring machine, car wheel, Bement.
Die heads, Geometric box tools.
Engine, 12x12 Erie hi-speed.
Engines, 14x32 and 22x42 Corliss.
Gear cutters, hi-speed, 3 p.

Hoists, 1 1/2-ton, (6).
Keyseater, Morton.
Lathes, 18" to 48".
Miller, No. 3 Brainerd universal.
Millers, slab, Grant, Lincoln.
Planers, 56", 62" and 72".
Press, arch, Farrel Foundry.
Radial, 48" U. R. D. plain.
Shaper, 16" Walcott.

New compound rests, drill vises, face plates, angle blocks, bearing scrapers.

FOR SALE BY

Peninsular Machinery Co.,

110 Beaubien St., Detroit, Mich.

Band saw, 24" Marsden.
Bader, No. 024.
Bader, No. 8 Niagara, power.
Blower, No. 1 Monogram.
Chuck, 24" 4-jaw, Ind.
Drill, 14" single spindle sensitive.
Drill, 4" wall type radial.
Drill, 12" Barr sensitive.
Drill, 4-spindle Bickford.
Drill, 14" Allen sensitive.
Exhauster, No. 1 American.
Forming roll, 14 ga., 48" long.
Grinder, emery, No. 3 Blount.
Grinder, saw, Cochrane-Bly.
Grinder, cutter, No. 1 Garvin.
Grinder, wet tool, 14" Sterling.
Grinder, twist drill, New Yankee.
Groover, No. 3 Niagara.

Hack saw, No. 4 Millford.
Hack saw, No. 11 Millers Falls.
Key lathe, 12" Cobb, double end.
Keyseater, No. 1 Davis.
Keyseater, No. 2 Mitts & Merrill.
Lathe, 14"x6" Fairbanks, c. r.
Lathe, 14"x6" eng., comp. rest.
Lathe, 19"x8" engine, quick change.
Lathe, 29"x8" LeBlond.
Miller, hand, No. 1 Whitney type.
Miller, Thurston die miller.
Oil separator, 24" centrifugal.
Press, No. 5 Perkins.
Press, No. 4 Michigan, o. b. i.
Speed lathe, 11"x4" Blount.
Speed lathe, 16"x6" Blount.
Speed lathe, 13"x5" Blount.

FOR SALE BY

E. L. Easley Machinery Co., 551-557 Washington Blvd., Chicago, Ill.

GRINDERS.

18" No. 7 Besly, double disc.
24" Leland-F., double wet tool, (3).
28" No. 1 Diamond automatic, face.

1-sp. Davis & Egan cock grinder.
6-sp. Milwaukee cock grinder.

SCREW MACHINES.

1" Cleveland automatics, (2).
1 1/2" Hartford automatic.
1 1/2" Cleveland automatics, (2).

11-16" No. 1 B. & O., hand.
1 1/2" No. 2 B. & S. semi auto.
1 1/2" Dreses, hand, f. g. hd.

MISCELLANEOUS.

Blowers, various sizes, (6).
Boring mill, 72" Bickford.
Boring mach., No. 1 1/2 Barret, hor.
Boring mach., No. 1 Rockford, hor.
Borer, cylinder, Moline 2 spindle.
Bolt cutter, 1 1/2" Acme, double head.
Brake, 8" Keene, hand power.
Centering mche., 1-sp., 5 1/2" Whiton.
Centering mche., 2-sp., 8" P. & W.
Drill, 2-sp. gang, 20" Mechanics.
Drill press, 32" Hoefer, b. g. & p. f.
Drill press, 32" Mechanics, b. g. & p. f.
Forming roll, power, 88" Bertsch.
Gear cutter, 48" Brainerd, spur.
Hammer, helve, 40 lb. Bradley.
Keyseater, No. 1 Knowles horiz.

Miller, 18x6x15 No. 0 Owen.
Millers, valve, for brass, (2).
Oil separator, No. 1 American.
Pipe machine, 2" No. 2 Bignall & K.
Pipe machine, 6" No. 6 1/2 Merrell.
Planer, 48"x48"x14" Pond, 1 head.
Planer, 24"x24"x6" Pond.
Planer, 24"x24"x8" Pond.
Profiler, No. 3 H. Becker-B.
Pulley lathe, 60" Stevens.
Radial drills, 2 1/2" to 8", (8).
Sprocket turning and boring machine combined, Baker Bros.
Sprue cutter, 10" Adt, power.
Welder, for boiler flues, Hartz.

SECOND-HAND MACHINERY

FOR SALE BY

The Fulton Tool Works,

Canal Fulton, Ohio.

TAPER ROLL.

No. 3 Williams & White taper roll, good as new.

HAMMER.

60-pound compact rubber cushion hammer, \$75.

FOR SALE BY

Niles-Bement-Pond Company,

111 Broadway, New York.

Located at Chicago, Boston and New York.

LATHES.

12"x 5' speed lathe.

16"x8' VonWyck, q. c.

18"x8' Barker & Chard, c. r.

20"x8' Hamilton, comp. r., q. c.

36"x18' Fifeild, c. r.

40"x16' Bement, c. r., old style.

30' pit lathe, 220 v. motors.

AUTOMATIC SCREW MACHINES.

1/2" Acme old style 4-sp. automatic.

1/2" Spencer single turret, auto.

BORING AND DRILLING MACHINES.

36" Brown & Sharpe turret borer.

34" spindle Niles horizontal boring and drilling machine.

3" spindle Pond horizontal boring and drilling machine, 220 v. motor.

10' Niles, heavy pat., 220 v. motors.

SHAPERS AND SLOTTERS.

10" Miles old-style shaper.

12" Bement old-style shaper.

16" Milwaukee crank shaper.

24" Niles geared slotter.

PLANERS.

22"x22"x 6' Harrington hd. planer.

24"x24"x6' Bertram.

26"x26"x 7' Niles, 1 head.

28"x23"x16' Miles, 2 heads.

30"x30"x8' Bertram, 1 head.

30"x30"x11' Niles, 1 head.

36"x36"x12' Bertram, 1 head.

42"x42"x20' Miles, 2 heads.

48"x48"x20' Sellers, 2 heads.

DRILLING MACHINES.

12" 1 spindle sensitive, 110 v. motor.

14" 3 spindle Henry & Wright.

17" 4 spindle gang, Jones & Lamson.

30" & 36" Gould & Eberhardt, sliding head.

No. 14 Pratt & Whitney multiple, 1" capacity.

No. 10 Pratt & Whitney multiple, 1 1/2" capacity, 10 spindles.

No. 1 Pawling & H. horizontal, belt drive.

No. 3 Pawling & H. horizontal, 220 v., d. c., motor drive.

Dallet and Prentice portable drills.

RADIALS.

24' Grant, semi-radial.

4' Barr, old-style.

5' Pond, 220 v., d. c., motor drive.

5' Niles, plain.

6' Niles, semi-universal.

RAILROAD MACHINERY.

79" Pond driving wheel lathe.

Bement double axle lathe.

Niles double axle lathe.

Bement car wheel lathe.

Niles hvy. car wheel lathe, like new.

BOLT CUTTERS.

14" Landis.

24" National.

4" Acme.

GRINDERS.

12x96" Springfield.

Automatic grinder, for saw blades.

18" Gorton disc grinder.

MISCELLANEOUS.

Cut-off machine, 4 1/2" Starr.

Grinder, 18" Gorton, disc.

Grindstone, 34", iron frame.

Miller, No. 2 Cincinnati plain, with dividing heads.

Pipe machine, 8" Cox.

Motor, 80 h. p., 220 v., d. c., Northern, 575 r. p. m.

Press, No. 5 Greenerd, arbor.

Rolls, 5"x8" hand power.

Screw mch., No. 5 Brown & Sharpe plain, chasing bar.

SECOND-HAND MACHINERY

FOR SALE BY

Wayne Machinery Co., Taylor St. & L. E. R. R., Fort Wayne, Ind.

Bolt cutter, 3" Acme.
Boring tool, No. B-3 Armstrong,
3-tool.
Drill, 4-sp., Fox Machine Co.
Drill press, 24" Springfield, b.g., p.f.
Drill press, 20" Canedy-O., w. & l. l.
Drill, No. 4 Fox, multiple head.
Grinder, drill & emery, W. & M.
Grinder, plain roll, 8x26" Diamond.
Grinder, wet tool, 12" Cady.

Lathe, speed, 10"x4" Reed.
Lathe, 16"x8" LeBlond.
Milling mche., No. 2 P. & W., hand.
Planer, 36x36x8 Powell.
Riveter, No. 530 Prouty.
Riveter, No. 1 Grant.
Tire welder, No. 4 L. & A.
Welding machine, No. 6-A Toledo
electric butt welder.

FOR SALE BY

Walcott Lathe Company, Jackson, Mich.

FOR IMMEDIATE DELIVERY.

Drill, 2-spindle Kokomo, all geared, high speed, in good condition.
Drill press, 26" Barnes camel back, geared, with tapping attachment, in first-class condition.
Lathe, 16"x8" Walcott, compound rest, steady and follow rests, tight and loose pulley countershaft, with 6 quick change feeds.
Lathe, 18"x14" Walcott, compound rest, steady and follow rests, double friction countershaft, 4-step cone, single back gear, old style change gears.
Lathe, 24"x10" Walcott, with turret on shears, power feed, compound rest, 5-step cone, single back gear, old style change gears, steady and follow rests, double friction countershaft, in first-class condition.
Planer, 28"x7" Gray, 1 head on cross rail, in fair condition.
Radial, 4" Bickford, single pulley drive, in good condition.
Radial, 4" Prentice, single pulley drive, in first-class condition.

FOR DELIVERY IN JUNE.

Lathe, 22"x25" Walcott, used for cutting lead screws with special Pratt & Whitney screw.
Milling machine, No. 24 LeBlond universal, 3-step cone, double back gear.

FOR SALE BY

Frank Toomey, Inc.,

127-131 N. Third St., Philadelphia, Pa.

LATHES.

62"x12" Putnam.
30"x14" New Haven, blocked to 36".
24"x12" Pittsburgh, d. b. g., q. c.
24"x16" Union.
26"x14" Star, h. s., c. r.
20"x8" Prentiss, h. s., c. r.
20"x10" Star, h. s., c. r.
20"x10" Flather, h. s., c. r.
18"x10" Prentice, d. b. g., q. change.
18"x10" Rahn-Meyer, h. s., c. r.
16"x12" LeBlond, motor driven.

15"x6" Davis, h. s., c. r.
14"x10" Prentice, h. s., c. r., t. a.
12"x5" New Shepard, (5).
40" swing Conradson turret lathe,
heavy, 34" hollow spindle.
24" Gisholt, motor drive.
2"x24" Jones & Lamson, (3).
24" wire feed Foster, ring turret.
14"x5" Bridgeport turret lathe.
16"x6" Windsor turret lathe.
24" Cleveland plain automatics, (4).

MISCELLANEOUS.

Boring mill, vertical, 36" Baker.
Boring mill, vertical, 52" Colburn.
Boring mill, vertical, 84" Sellers.
Drill, 36" Baker, motor driven.
Drill, 36" Baker Bros., 4" spindle.
Hammer, steam, 350 lb. Bement.
Hammer, steam, 600 lb. Morgan.
Miller, plain, No. 34 Fox, vertical
attach., index head and centre.
Miller, plain, No. 2 Cincinnati,
index head and center.
Miller, vertical, Beaman-Smith.
Planer, 18"x18"x5" Pond.

Planer, 22"x22"x6" Powell.
Planer, 30"x30"x12" Bement type.
Planer, 48"x48"x15" Sellers.
Planer, 54"x48"x8" Sellers.
Pulley borer, 60" Harrington.
Radial drill, 36" Gang.
Radial drill, 48" Harrington.
Radial drill, 76" Baush.
Shaper, 14" Steptoe.
Shaper, 20" Smith & Mills.
Shaper, 18" Barker.
Shaper, 24" Smith & Mills, b. g.
Shaper, 30" Cincinnati, triple grd.

SECOND-HAND MACHINERY

FOR SALE BY

The Motch & Merryweather Machinery Company,
707-715 Lakeside Av., N. W. Cleveland, Ohio

Branches: Detroit, Cincinnati, Pittsburgh.

LINCOLN MILLERS.

100—No. 7 Becker-Brainard, Pratt-Whitney and other makes.

SENSITIVE DRILLS.

50—Two, three and four spindle sensitive drills.

These are in addition to our regular list of used and rebuilt machine tools for immediate delivery. Write us if you are in the market to buy or sell machine tools.

FOR SALE BY

Chas. Molitor Machinery Co., 215-221 S. Clinton St., Chicago, Ill.

Immediate Delivery.

LATHES.

14"x 6' Lodge & Davis.

14"x 6' Putnam.

16"x 8' Porter.

22"x 10' Wright.

22"x 12' Fifield.

26"x 12' Hamilton.

30"x 22' 6" New Haven.

32"x 14' Putnam.

36"x 14' Putnam.

42"x 16' New Haven.

SHAPERS AND PLANERS.

14" Lodge & Davis.

16" Baush & Harris.

20" Steptoe, geared.

26" Walcott.

26" Davis & Egan.

20"x 6' Wheeler planer.

24"x 6' Pond planer.

30"x 7' Whitcomb planer.

30"x 8' Fitchburg planer.

DRILL PRESSES.

22" Cincinnati.

28" Mechanics.

31" Gould & Eberhardt.

36" Grant universal.

MISCELLANEOUS.

Millers, 6 smaller, different sizes.

Punch press, No. 208 Toledo.

Roller, 6"x 10', power.

Screw machine, 14" Pearson.

Screw machine, Pratt & Whitney

double spindle automatic.

Slotter, 12" Putnam.

Turret lathe, 16" Springfield Fox.

FOR SALE BY

Wm. C. Johnson & Sons Machinery Co.,
210-212 Washington Ave.,

St. Louis, Mo.

LATHES.

18"x 6' Lodge & Davis.

18"x 8' Lodge & Davis.

18"x 10' Bradford.

22"x 10' Blaisdell.

24"x 14' Walcott.

26"x 16' Perkins.

30"x 20' New Haven.

DRILLS.

20" Sibley & Ware.

32" Hamilton, sliding head.

SHAPERS AND PLANERS.

20" Hendey.

22"x 22"x 5' Pease.

24"x 24"x 6' Cincinnati.

32"x 32"x 14' Niles.

AIR COMPRESSORS.

6x6 belted.

8x8 belted.

9x9x9 steam driven.

10x10x10 steam driven.

600 cu. ft., belted.

1600 cu. ft., steam driven.

MISCELLANEOUS.

Air hammers, (6).

Bolt cutter, 2" Schlencker.

Boring mill, 83", one head.

Borer, 2-spindle Newton, horizontal.

Hammers, steam, 300 and 600 lbs.

Hammer, 60 lb. Yeakley.

Hammers, helve, 100 lb. Bradley, (2).

Pipe machine, 24" to 8" Forbes.

Pipe machines, 4 and 6" portable.

Presses, inclinable, (2).

Punch and shear, 25" throat, No. 15

Williams-White.

Punch and shear, 48" throat.

Riveter, 10" cylinder compression.

SECOND-HAND MACHINERY

FOR SALE BY

W. L. Perkins, Jr.,

30 Church St., New York

LATHES.

24"x10' Putnam, c. r., cross feed.
26"x14' Putnam, c. r., cross feed.
28"x14' Putnam, c. r., cross feed.

32"x10' Putnam, c. r., cross feed.
70" Sellers d. h. wheel lathe.
80" Bement d. h. wheel lathe.

PLANERS.

30"x30"x10' Chandlers, 2 heads.
32"x32"x8' Pond, 2 heads.

36"x36"x10' Woodward & P., 2 hds.
60"x60"x14' Sellers, 2 heads.

RADIAL DRILLS.

5' Drees, tapping.
6' Bickford, tapping.

7' Baush, tapping.
8' Pond, tapping.

FOR SALE BY

Cyril J. Bath, Mch. Merchant, 340 Leader News Bldg., Cleveland, O.
Warehouse, 1031 W. Front St.

Stock on hand.

Boring mill, vertical, 30" Baush, belt feed, good.

Boring mill, vertical, 48" Gisholt, turret and plain head, motor drive, late model, good as new, with motor.

Boring mill, horizontal, 54" bar Bement-Miles, gear feed, good condition, belt or motor drive.

Cold saw machine, 48" Espen-Lucas, with inserted tooth blades, good as new.

Cut-off machine, 5" Hurlbut & Rogers automatic.

Drills, rail type, 3 and 4-spindle Foote-Burt hi-speed, about 1" cap.

Gear shaper, 24" Fellows, good condition.

Grinder, disc, 18" Gorton, one swivel table, one plain, good as new.

Hammer, power, No. 4 Beaudry Champion, good as new.

Keysater, No. 1 Baker, complete and good as new.

Lathe, 14" Prentice, rise and fall rest, fair.

Lathe, 22"x10' Bement-Miles, heavy power feed turret for shears, gear feed, compound rest, hollow spindle, good condition.

Lathe, 24"x16' Fifield, compound rest, good.

Lathe, 38"x18' Fifield, solid spindle, good shape, compound rest.

Piston automatics, P. & J., (3).

Planer, 52"x42"x14' Powell, 2 heads, good condition.

FOR SALE BY

Strong & Hery Co.,

210 State St., Rochester, N. Y.

In stock for immediate delivery.

LATHES.

20"x10' Hamilton, style B, new, (4).

16-22"x8' Sebastian gap lathe.

16"x11' Hendey, q. c., c. r., t. a.

13"x6' Barnes, p. c., c. r., h. s.

18"x8' Porter, p. c., c. r., h. s.

CUTTING-OFF MACHINES.

3" Burke cutting-off machine.

6" Cochrane-Bly cold saw.

RADIAL DRILL.

5' Niles, gear box drive.

MILLING MACHINES.

No. 5 B. & S. vert., latest design.

No. 2 Cincinnati plain, old style.

ELECTRIC MOTOR.

15 h. p., 220 v., 1000 r. p. m.

PUNCH PRESS.

No. 20 Bliss, geared.

HIGH SPEED STEEL.

15 ft. 3" rd. Colonial.

18 ft. 3 1/2" rd. Star.

3 ft. 4" rd. Zenith.

We also always carry in stock for immediate shipment a large assortment of new round, flat, square and hexagon Cold Rolled Steel; Lathe and Drill Chucks; Arbor Presses, Grinders, Electric Motors, Screws, Bolts, Milling Cutters, etc. Advise us concerning your requirements. We feel confident that we can serve you to your advantage.

SECOND-HAND MACHINERY

FOR SALE BY

F. H. Kappen & Son, Agents, 93 W. Water St., Milwaukee, Wis.
NEW AND USED MACHINERY.

Air compressor, 6x6x7.
Blowers, pressure.
Cutting-off machines, Burke and Burr.
Cutting-off mche., No. 60 Foundry.
Dividing head, 10" and 12" Owen.
Drill presses, sensitive.
File sharpener, American.
Lathe, 18" x 8" Wheeler, comp. rest.

Planer, iron, 26" x 26" x 7'.
Press, geared, No. 6 Model H.
Perkins, 2" stroke.
Press, geared, No. 6½ Perkins, 4" stroke.
Press, geared, Model H. Perkins, 6" stroke.
Screw mche., 4" Pratt & Whitney.
Turret lathe, 14".

FOR SALE BY

Broadway Machinery Co., 236-238 Broadway, Cincinnati, Ohio

LATHES.

13" x 8" Sebastian, h. s., c. r.
16" x 8" Reed, h. s., c. r.
17" x 6" Porter, h. s., c. r.
18" x 8" Lodge & Davis, h. s., c. r.
18" x 10" Robbins, h. s., c. r.

22" x 10" Niles, h. s., c. r.
24" x 16" Blaisdell, h. s., c. r.
26" x 16" Niles, h. s., c. r.
28" x 20" New Haven, c. r.
68" x 36" Niles, c. r.

SHAPERS AND PLANERS.

20" Hendey, friction geared.
24" Steptoe, geared.
21" Juengst, b. g. crank.

30" x 30" x 8" Fitchburg, 1 head.
36" x 36" x 10" Pond type, 1 head.
48" x 48" x 24", 1 head, \$500.

MISCELLANEOUS.

Bolt cutters.
Boring mills, 12' and 18'.
Drill presses, all sizes.
Lathe chucks, all kinds.
Miller, vertical, No. 9 Niles-B. P.

Punch, No. 3 Long & Allstatter.
Punch & shears, No. 8 L. & A.
Radial drills, Niles, (2).
Slotter, 20" Niles.

FOR SALE BY

Brown-McDonald Machinery Co.,

906-908-910 North Market Street, - - - St. Louis, Mo.

LATHES.

9" x 3' 3" Barnes, foot and belt power.
11" x 5' Barnes, foot and belt power.
13" x 6' Sebastian, h. s., p. r.
13" x 6' South Bend, (new).
14" x 5' Putnam, s. s., p. r.
14" x 8' Fitchburg, s. s., p. r.

15" x 8' South Bend, (new).
16" x 8' South Bend, (new).
17" x 8' Fifeild, h. s., p. r.
18" x 6' Lathe & Morse, s. s., p. r.
18" x 8' South bend, (new).
Fox brass lathes, (4).

DRILLING MACHINES.

Barnes, ½" capacity, single spindle.
King, ½" capacity, single spindle.
Reed 4-spindle No. 33, ½" capacity.
New 20" Canedy-Otto No. 40.
New 20" Champion, w. & l., (3).

New 20" Champion, w. & l., back geared and power feed, (3).
New 24" Aurora, s. h., back geared and power cross feed.
36" s. h., back geared, p. f.

PLANERS.

26" x 26" x 7' Whitcomb.

30" x 30" x 9' New Haven.

COMPRESSORS.

8x8 Star, sgl. cyl., dbl. a., belted.
10x10 Star, with 10x10 vert. engine.

950 cu. ft., Ingersoll, steam.
20x20x13½" Norwalk, straight line.

MISCELLANEOUS.

Bolt cutter, sgl. hd., 14" National.
Cold saw, Q. & C.
Friction saw, Ryerson, motor driven.
Gear cutter, No. 11 Dwight Slate.
Gear cutter grinder, No. 1 Gould & Eberhardt.
Hack saw, Atkins Kwik Kut.
Hammer, upright, 90 lb. air cushion.
Hammer, helve, 60 lb. Knowlton.

Hammer, helve, Rochester, size B.
Milling machine, Lincoln type.
Pipe machine, 4" Bignall & Keeler.
Rolls, 8" Hilles & Jones, cap. 4".
Seamer, double, No. 2 Swaine.
Shaper, 14" Steptoe, crank.
Slab miller, 48" Cincinnati.
Steel brakes, 4' and 8'.

SECOND-HAND MACHINERY

FOR SALE BY

Western Machinery Co., 12 West Third Street, Cincinnati, O.

LATHES.

32"x8' Halladay, chuck.....	\$ 300.00	18"x10' engine lathe, hol. spdl.	\$ 290.00
18"x8' South Bend.....	400.00	18"x8' Niles, p. r.	125.00
30"x22' New York, c. r.	250.00	28"x16' New Haven, c. r., taper	750.00

SHAPERS.

12" Lodge & D., vise and c. s.	\$150.00	16" Smith & Mills.	\$ 235.00
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MISCELLANEOUS.

Chain block, triplex, 4-ton Yale & Towne.....	\$ 52.50
Drills, sensitive, 13" Knecht, (2), each.....	47.50
Sander, triple drum, 42" Berlin Invincible.....	300.00

FOR SALE BY

Chas. N. Braun, 1311 E. Lewis St., Fort Wayne, Ind.

LATHES.

9"x38" lathe, new.....	\$ 75.	20"x11'8" Shepard.....	\$350.
15"x8'8" Sebastian.....	190.	20"x17' J. & L., h. s.	650.
16"x6'4" Fildfield.....	225.	4" P. & W. auto. screw machine	475.
16"x8'6" Reed.....	300.		

MISCELLANEOUS.

Drill press, 18".....	\$ 30.00	Radial drill, 36" Universal.....	\$275.00
Grinder, 2-wheel emery, bench.....	7.50	Shaper, 9" Hewes & Phillips	100.00
Miller, No. 3 Brainard plain, with \$150 worth of equip.....	575.00	Shaper, 20" Lodge & Davis..	325.00

FOR SALE BY

Enterprise Machinery Co.,

32-34 S. Clinton St., Chicago, Ill.

Band resaw, Cordesman, 48'.....	\$ 275.	Punch press, No. 75 C., 12000 lb.	\$1000.
Band saw, 20", tilting table.....	30.	Punch press, No. 2, o. b. i.....	85.
Band saw, 26", tilting table.....	48.	Punch press, new Emco No. 3, o. b. i. wt. 2000 lbs. qck. delivery	265.
Bench lathe, 20 col., c. r. cost \$375	85.	Shaper, 6", B. & P., slid. hd. a	75.
Boring mill, Niles, 6" vertical	2200.	Shr., bevel, Thomas, h. g., 3" cap.	175.
Drill, new Emco, bench.....	14.	Shear, power, 42", 1" capacity..	250.
Drill, 22" Schumacher, w. & l. id.	45.	Square shear, 22" Queen City.	22.
Lathe, turret, 6-hole, 18".....	160.	Sq. shear, 8', 18 g. all steel, new.	240.
Lathe, Merritt, auto, w'd. turn'g	150.	Welder, spot, Detroit new, guar.	250.
Miller, Lincoln, 6x21", like new	110.		

FOR SALE BY

Clark Machinery Co.,

1302 Ontario Ave., Cleveland, O.

Blower, No. 1 Root.		Miller, plain table, 48x104.	
Bolt cutter, 2" Acme.		Miller, universal, Brainard, b. g.	
Boring mill, horizontal, 4 1/2" Barrett.		Millers, Lincoln type, heavy, table	
Drill, Western, 8-spindle multiple.		46x74.	
Drills, 4 spindle, 4" Prentice, (6).		Planer, 24"x24"x6" Hendey.	
Gear cutter, No. 13 Mitts & S.		Planer, 24"x24"x6" Powell.	
Grinder, disc, No. 8 Besly.		Planer, 40"x40"x8" Pond, heavy, 1 hd.	
Grinder, planer type, surf. 24"x4'.		Radial drill, 30" Gang.	
Grinder, surface, Pratt & Whitney.		Radial drill, 4" Dreses.	
Keyseater, No. 2 Mitts & Merrill.		Radial drill, 6" Dreses universal.	
Keyseater, No. 1 Mitts & Merrill.		Screw machine, 3" Brown & S. auto.	
Lathe, 21"x12' Blaisdell, c. r.		Screw machine, 2 1/2" Cleveland auto.	
Lathe, 18"x6' L. & D., c. r., taper.		Screw machine, 2" Warner & Swasey, hollow hex.	
Lathe, 18"x8' Bradford, c. r.		Shaper, friction, 15" Hendey.	
Lathe, 24"x12' New Haven, c. r.		Shaper, crank, 18" Kelly.	
Lathe, 28"x14' Pond, compound.		Shaper, friction, 25" Hendey.	
Lathe, double head key lathe.			
Lathe, 38"x20' Fildfield, triple geared.			

SECOND-HAND MACHINERY

FOR SALE BY

Brownell Machinery Co.,

Chucking lathe, 20"x6" Florence.
Drill, 8-sp. multiple Baush.
Drill, 6-spindle No. 4 Quint.
Engine lathe, 12"x5" Davis.
Engine lathe, 16"x8" Perkins.
Engine lathe, 18"x8" Star Tool Co.
Engine lathe, 20"x8" Flather.
Engine lathe, 20"x12" Perkins.
Grinder, 20"x108" Landis.
Hammer, steam, 700-lb. Bell.

11-13 Eddy St., Providence, R. I.

Miller, vertical, No. 3 Becker, new.
Planer, 24"x24"x5" Wheeler.
Planer, 72"x72"x10" Betts, 2 head-
Punches, No. 2 Royersford, (2).
Radial drill, 3" Dreses.
Radial drill, 4" Dreses.
Shapers, 14" Ohio pl. crank, new, (2).
Shaper, 15" Kelly, crank, new.
Shaper, 16" Ohio plain crank, new.
Shaper, 21" Juengst, crank.

FOR SALE BY

Neidow & Payson Co.,

Automatics, from 8" to 2".
Boring and turning mills, 41" to 100".
Borer, 2-spindle cylinder.
Cold saw, 36" blade.
Drills, 5" Niles radial.
Drills, multiple spindle and sensitive.
Gear hobber, 18" Grant-Lees.
Gear cutter, G. & E. and B. & S.
Grinder, No. 5 Bath, double.
We have four new 22" heavy duty plain

9 So. Clinton St., Chicago, Ill.

Lathe, 9" to 90" swing.
Lathes, 2" and 3" J. & L.
Miller, No. 3 Brainard universal.
Miller, P. & W., spline.
Miller, 72"x48"x10", slab.
Pipe machine, 6".
Planer, 40"x12" New Haven.
Planer, 48" Cleveland open side.
Press, 200 ton Niles car wheel.

turning lathes; immediate delivery.

FOR SALE BY

O. T. Webb,

91 Wisconsin St., Milwaukee, Wis.

Drill press, 20" Prentice Bros., with tapping attachment,	265.
Drill press, heavy, 50" Bement-Miles, and c. s.	385.
Gear cutter, 24" Becker-Brainard automatic, regular equipment,	475.
Lathe, 13"x5", No. 13 Barnes, chuck fitted, foot power,	115.
Lathe, 14"x6", Lodge & Davis, compound rest, t. a., chuck fitted,	275.
Lathe, 16"x8", compound rest, power cross feed, chucks fitted,	250.
Lathe, 18"x8", compound rest, hollow spindle, chuck fitted,	250.
Lathe, 36"x12" Perkins, comp. rest, 11" raising blocks, chuck,	615.
Miller, No. 2 Kempsmith plain, center heads, vise, table 32x64,	450.
Planer, 36"x36"x8" Pond, parallel drive,	825.
Radial drill, 4", back geared, side table, fair condition,	425.
Shaper, geared, 24" Hendey, vise and countershaft,	175.
Turret lathe, No. 10 Potter & Johnston auto., 5 1/2" hole, special,	1095.

FOR SALE BY

J. L. Osgood,

45 Pearl St., Buffalo, N. Y.

Automatic No. 5-A Potter-Johnston.
Bolt head shaver, 4-sp. Nat-Acme.
Cutting-off machine, 2" Hurlbut & Rogers, motor drive.
Drill, 21" Hoefler, s. & lever, p. f.
Drill, 20" Barnes, s. & lever.
Grinder, heavy floor, ring oiling, 18" wheels.
Hack saw, 4", Power.
Lathes, 11"x4" Reed, (5).
Lathe 12"x4" speed lathe.
Lathe, 15"x6" Flather.
Lathe, 16" American Fox, b.c. casing.
Lathe, 16"x6" Gray.
Lathe, 20"x8" Fay & Scott, turret.

Lathe, 86"x30" Fitchburg.
Miller, Lincoln, Carter & Hakes.
Miller, semi-auto., 12" Cincinnati.
Miller, univ., No. 3-B Milwaukee.
Miller, 6x48" P. & W., thread miller.
Pipe machine, No. 7 Jarecki.
Piston ring mch., Gridley auto.
Piston ring mch., Gridley, motor dr.
Planer, 30"x30"x8" Flather, 2 heads.
Planer, 40"x40"x9" Farrell, 1 head.
Press, power, Dodge, 24" wheel, 1" throw.
Saw, Espen-Lucas, 8" bar cap.
Screw machines, No. 1 B. & O., (2).
Screw machines, No. 2 B. & O., (6).

SECOND-HAND MACHINERY

FOR SALE BY

L. F. Seyfert's Sons, Inc.,

437 N. 3rd St., Philadelphia, Pa.

LATHES.

18"x10' Porter.
16"x 8' Bradford.
16"x 6' Bradford, (2).
16"x 6' Prentice.
16"x 6' Cleveland.
15"x 6' South Bend, (2).
16"x 6' South Bend.

14"x 8' Fay & Scott.
14"x 6' Lodge & Shipley, q. c. g.
14"x 6' Monarch.
14"x 6' Bradford, (2).
14"x 6' LeBlond, q. c. g.
13"x 5' South Bend.
18"x10' South Bend.

SHAPERS.

22" Hendey, rack.
20" Kelley.

20" Steptoe.
15" Niles-Bement-Pond.

SPECIAL SHEET METAL MACHINES.

Bending rolls, 10' Hilles & Jones.
Bending rolls, 6'.

Squaring shear, 10' Ohl.
Press or brake, 10' Ohl.

MISCELLANEOUS.

Drills, 20" Barnes, (5).
Drills, 20" Aurora, (3).
Drill, 28" Barnes.
Drill, 20" Rockford.
Drill, 17" Rockford.
Drill, 30" Bickford, plain radial.
Miller, 24"x24"x6" Ingersol. slab.
Planer, 26"x36"x8" American.
Planer, 22"x22"x5" Whitcomb.
Press, 350-ton Hoe hydraulic.

Press, P3 Ferracute.
Press, No. 2 Philadelphia.
Press, No. 2 Bliss.
Punch, No. 1 Hilles & Jones.
Punch, No. 2 Hilles & Jones.
Punch, No. 3 Hilles & Jones.
Punch, horizontal, capacity $\frac{1}{2}$ " in $\frac{1}{2}$ ",
Hilles & Jones.
Saw, cold, Newton, 28" blade.
Shear, beam, Henry Pels.

Second-Hand Wood-Working Machinery

For a large list of used wood-working machinery, consult the **Wood-Working Machinery List**, a publication similar to this but devoted to the advertising of saw-mill and wood-working machines. A copy may be had on application to the publisher, **A. H. Hitchcock, 1220-1235 Caxton Building, Chicago, Ill.**

Used Machine Tools

What do you want?

If it's a high class Used Machine Tool you are looking for, better let me know of your wants, as I may save you both Money and Time.

What have you for sale?

If it's used machinery that you want to either sell or exchange, I can help you.

Service---Low Cost

I devote my entire time and experience to the bringing together of Buyer and Seller, so that a deal can be quickly made.

State your wants, or carefully describe the machines you have for sale in your first letter, which will receive my prompt personal attention.

D. M. OSBORNE, Suite 917
American Trust Building, **CLEVELAND, OHIO**

We Handle New Machinery We Buy and Sell Used Machinery

We need no introduction to our patrons.

We want to assure those who are not so well acquainted with us, however, that we are not a war product, but established dealers. And while many are tempted to make extra profits during these strenuous times, our policy—which we believe will prove profitable from a strictly business standpoint—is to do business with you in such a way as to hold your patronage after the war is over.

We will do business anywhere, but we particularly solicit the patronage of plants in New England and contiguous territory, for our location enables us to give more careful personal attention to the needs of our customers in this section.

What do you need? What have you to sell?

Purinton & Smith, Hartford, Conn.

Some Lathes

Slightly Used Lodge & Shipley Make That Will Increase Your Production

No. 79—22"x16' Double Head
5-Step Cone Head Lathe.
No. 19—20"x12' Pat. Hd. Lathe.
No. 33—20"x12' Pat. Hd. Lathe.

No. 35—20"x 8' Pat. Hd. Lathe.
No. 87—24"x12' Pat. Hd. Lathe.
No. 32—22"x10' Pat. Hd. Lathe.
No. 42—36"x12' Pat. Hd. Lathe.

OTHER MACHINES.

No. B—36"x35"x12' Niles Single Head Planer.
No. 1337—Crompton, Knowles Loom Works Keyseater, 60" stroke, 48" swing.
No. 661—Globe Tool Sharpener for 4"x6".
No. 1379—Universal Swivel Table for radial drill.
No. 515—Oliver No. 3 Wood Trimmer on pedestal.
No. 1607—Bowsher Balancing Ways.

No. 690—Marion Buffing Mch.
No. 1336—No. 00 Sturtevant Blower.
No. 2531—Sturtevant Blower, 24" outlet.
No. A-3933—Laidlaw-Dunn-Gordon Duplex Feed Pump.
No. 60—Covel Mfg. Co. Automatic Circular Saw Sharpener.
No. 2033—Commercial Electric D. C. 40 k. w. 110 volt Generator, compound wound.
1—15 h. p. Gas Engine, 215 rpm.

For Delivery NOW

The Lodge & Shipley Machine Tool Co.
Cincinnati, Ohio, U. S. A.

Presses, Hammers, Etc.

For Immediate Delivery, All in Good Condition

- 1— 500 ton Hydraulic Press, with pump and accumulator.
- 1— 40 ton Hydraulic Press, without pump or accumulator.
- 1—1000 ton Double Acting Drawing Press.
- 1— 160 ton Bliss Drawing Press, capacity 16"x8"x16 ga.
- 2— 160 ton Blanking Presses, 3¼" stroke.
- 1— 80 ton Ferracute 8" stroke, geared.
- 2—No. 76 Bliss style, 2½" & 3¼" strokes, geared.
- 6—No. 76 Bliss Press, not geared, 1¾" stroke.
- 1—No. 54 Ferracute Press, 3" stroke.
- 2—Punch Presses, equal Bliss No. 18, 2" stroke.
- 4—National Washer Making Machines, ¾" to 2".
- 1—3000-lb. Bliss Steam Hammer.
- 1—1500-lb. Bement-Miles Steam Hammer.
- 1— 800-lb. Bliss Belt Drop Hammer.
- 1— 800-lb. Bliss Board Drop Hammer.
- 1— 800-lb. Williams-White No. 7 Drop Hammer.
- 2— 400-lb. Phoenix Belt Drop Hammers.

For full particulars and price, write or wire

D. M. Osborne Machinery Company
Suite 917 American Trust Building, Cleveland, Ohio

NOT "Traded In" Tools— But High-Grade Modern Tools

Out Of Entire Shop Equipments Recently Purchased:

Lathes

24"x14' Schumacher & Boye.
24"x15' triple-gear, Bement.
24"x24' Fitchburg, raise-blocks to 30" swing.
26"x10' Pond.
28"x15' Worcester.
30"x14' Bement-Miles.
36"x 8' Pond.
36"x16' Putnam.
38"x18' Putnam.
42" tire lathe, Niles Tool Wks., 2 hds.
42"x17' Pond, triple-gear, raise-blocks to 70", extra heavy.
48"x16' Pond style, triple-gear.
56"x28' Putnam, triple-gear.
60"x25' New Haven, triple-gear.
32-54" swing, 26' bed, McCabe double-spindle lathe, geared plate.

Turret Lathes

24" swing, Gisholt, rapid traverse to turret, 2 1/2" hollow-spindle.
21" swing, Gisholt, 30" in gap.
Potter & Johnston, 7 1/2"x14" capacity, 4 1/2" hollow-spindle.
Potter & Johnston, 20" swing, 2" hollow-spindle.
Garvin No. 13, wire feed 1 15-16".

Upright Boring and Turning Mills

7-12' swing, Betts, extension type, double head, extra table 10' diam.
86" swing, Niles Tool Works, 2 hds.
84" swing, Pond Mch. Tool Co. 2 hds.
74" swing, Niles Tool Works, 2 hds.
54" swing, Colburn M. T. Co., 2 hds.
51" swing, Niles Tool Works, 2 hds.
42" swing, Bullard M. T. Co., 2 hds.
38" swing, Niles Tool Works, 2 hds.
37" swing, Bullard M. T. Co., 2 hds.
36" swing, Brown & Sharpe, tur. hd.

This Lot

used by the Union Foundry & Machine Co., West Carson St., Pittsburgh, Pa.—still in the Plant, and will be disposed of from there at prices which will make it an inducement for you to inspect immediately:

7' extended to 12' Swing UPRIGHT BORING & TURNING MILL "Betts Machine Co." Double head with "extra" table 10' diam. and extensions for full swing work, complete with Jaws, Countershaft and regular equipment.

60"x18" "Pond" Planer, with two heads on rail, complete.

15" stroke SLOTTING MACHINE built by the "Dill Slotter People" with all their "special features."

30" Swing, 16' bed "LeBLOND" ENGINE LATHE, with Cabinet Legs, Hollow-spindle, 2" hole, Chuck and C-shaft.

24" Swing, 14' bed "SCHUMACHER & BOYE" ENGINE LATHE, Cabinet Legs, Hollow-spindle, 2" hole, Chuck and C-shaft.

2" "DETRICK & HARVEY" BOLT CUTTER with "Cooke" Patent Diehead, Dies and C-shaft.

This Big Horizontal Boring Machine—still in the Plant West of Pittsburgh:

"Niles-Bement-Pond" Horizontal Boring, Drilling and Milling Machine, Traversing spindle 8" diam, Vertical adjustment on column 24' Upright column that carries head and working parts has auto. feed 24' along bed. Total weight 200,000 lbs. Cost new \$16,000 and will be sold for nearly half.

Send for complete list No. 254

J. J. McCabe, 149 Broadway, New York

First Class Used Machine Tools

Engine Lathes.

14"x6' Silk.
16"x6' Mueller.
16"x7' Oliver, (new).

18"x10' Rahn Carpenter.
20"x14' Rahn Carpenter, gap.
24"x10' Niles.

Screw Machines and Turret Lathes.

No. 2½ Pratt & Whitney Hand Screw Machine.
15" American Fox Monitor Brass Lathe.

Bench and Speed Lathes.

8" Bench Speed Lathe.
14" Spinning Lathe.

16"x6' Blount Speed Lathe, with set over tail stock.

Boring Machines.

54" Bement, horizontal.
No. 3½ Binsse, horizontal.
28" bar Franklin, tool room.

No. 1 Barnes, horizontal.
60" American, vertical.
6-8" Betts, vertical.

Drill Presses.

20" Prentice, w. & l.
23" Barnes, w. & l.
28" Sibley & Ware, sliding head.
31" Barnes, sliding head.
32" Hamilton, sliding head.
4-spindle Dwight-Slate, sensitive.

4-spindle Gardam, adjustable.
2-spindle Rockford, 14" power feed.
34" Morris Radial.
3½" Roos & Mills semi universal radial.

Shapers.

14" Hughes & Phillips, snagging.
14" Niles, traveling head.

24" Gould & Eberhardt, crank.

Presses.

No. 18 Crosby.
No. 19 Crosby.
No. 1 McDonald.
No. 1 Wold.
No. 42 Bliss.

No. 119 Crosby.
No. 3 Stiles.
No. 69-N Bliss.
No. 12-A Adriance.

Keyseaters.

No. 2 Mitts & Merrill.
No. 3 Mitts & Merrill.

No. 5 Mitts & Merrill.

Milling Machines.

No. 2 Kempsmith, plain.

No. 2 Hisey, plain.

Planers.

26"x26"x6' Flather.
30"x30"x8' Gray.

32"x32"x8' New Haven.

Miscellaneous.

Axle lathe, Niles double end.
Belt lacing machine, Birdsboro.
Bending roll, 12".
Cold saw, No. 1 Burr.
Cold saw, Espen-Lucas.
Grinder, disc, 18" No. 26 Besly.
Grinder, disc, 18" Gorton.
Grinder, cock, Warner & Swasey.

Oil separator, Curtiss.
Punch, single end, No. 4 Long & Allstatter.
Rivet spinning mche., No. 82 Grant.
Sander, 48" Berlin.
Screw press, No. 1½ Stiles.
Slotter, 12".

Rumely-Wachs Machinery Co.
121 N. Jefferson St., Chicago, Ill.

ReMANUFACTURED -(ORIGINATED BY US)- MACHINE TOOLS

FOR QUICK SHIPMENT

Partial List of Largest Stock in the World

RADIAL DRILLS.

- 3-3' Prentice.
- 1-4' Prentice.
- 1-8' Lodge & Davis.
- 1-8' Western.
- 1-6' Baush.
- 1-6 1/2' Baush.

SHAPERS.

- 2-14" Steptoe.
- 3-15" Hendey.
- 1-15" Stockbridge.
- 1-16" Garvin.
- 1-16" Ohio.
- 2-16" Steptoe.
- 2-16" Flather.
- 1-17" Davis & Egan.
- 1-18" Barker.
- 1-20" Steptoe.
- 1-20" Hendey.
- 1-20" Smith & Mills.
- 1-20" Gould & Eberhardt.
- 1-22" Ohio.
- 1-22" Walcott.
- 1-24" Smith & Mills.
- 1-24" Barker.

GEAR CUTTER.

- 1-No. 13 Brown & Sharpe.
- 2-24" Fellows.
- 2-30" Flather.
- 1-No. 5 Brown & Sharpe.
- 2-36" Brainard.

PLANERS.

- 1-22" x 5' Gray.
- 1-22" x 6' American.
- 1-24" x 6' Davis & Egan.
- 1-24" x 6' Whitcomb.
- 1-24" x 6' Flather.
- 3-24" x 6' American.
- 1-24" x 6' Pond.
- 1-24" x 6' Gray.

PLANERS—Continued.

- 1-26" x 6' Hendey.
- 1-26" x 7' Gray.
- 2-27" x 6' Ohio.
- 1-27" x 7' Flather.
- 1-30" x 6' Pease.
- 1-36" x 8' Ohio.
- 1-36" x 10' Pond.
- 1-36" x 10' Gray.
- 1-36" x 17' Powell.

TURRET and SCREW MCHS.

- 1-12" Pearson.
- 1-12" Kempsmith.
- 1-13" Gisholt.
- 1-14" Garvin.
- 1-15" Bardons & Oliver.
- 1-20" Foster-Kimball Fox.
- 1-20" x 7' Davis & Egan.
- 1-22" x 7' American.
- 3-22" Potter & Johnston.
- 1-24" Gisholt.
- 6-7-16" Pratt & Whitney.
- 1-11-16" Pratt & Whitney.
- 1-4" Warner & Swasey.
- 2-1" Costello.
- 1-1" Wood.
- 1-14" Wood.
- 1-14" American.
- 1-14" Bardons & Oliver.
- 1-14" Bardons & Oliver.
- 4-2" x 24" J. & L., Cone.

MISCELLANEOUS.

- 1-No. 14 Brown & S. Pl. Grinder.
- 1-40 lb. Bradley Helve Hammer.
- 1-100 lb. Bradley Helve Hammer.
- 1-800 lb. Morgan Steam Drop.
- 1-No. 2 Lapointe Broaching Mch.
- 1-No. 3-A LaPointe Broach'g. Mch.
- 1-No. 4 Niles Slotter.
- 1-No. 3 Williams-White Bulldozer.
- 1-No. 4 Williams-White Bulldozer.

A New Green List Now Ready.

HILL, CLARKE & CO. OF CHICAGO
125 N. CANAL ST., CHICAGO, ILL.

For Sale

5—3"x36" Jones & Lamson Turret Lathes

Regular Equipment. New—Immediate Delivery

- 1—4' Western Fall Universal Radial Drilling Machine, complete with Reeves Variable Speed Countershaft. This machine is modern and in fine condition.
- 1—30 H-P. Nash 3 Cylinder Gas Engine, hit and miss type governor, in good condition.
- 1—7' Pond Boring and Turning Mill, with 2 swivel heads, countershaft, etc. In good condition. Delivery 90 days.
- 1—Horizontal Boring and Milling Machine; bores to center of 42" work placed on compound table; double back geared, cone driven; takes $7\frac{1}{2}$ " between centers; power longitudinal and cross feeds. Manufactured by Nicholson & Waterman. In first class condition and suitable for accurate boring or milling.
- 1—38"x14' 6" New Haven Lathe, 8' center, compound rest, taper attachment, all equipment including chuck, wt. 11,000 pounds.
- 1—120"x45' Bed Putnam Engine Lathe, triple geared, face plate, compound rest and full equipment, A-1 condition.
- 1—52"x30' Engine Lathe, t. g., c. r., all equipment, good.
- 1—36"x36"x10' Ingersoll Slab Miller, with 1 side spindle, fine condition.
- 1—22"x6' Ingersoll Slab Miller, fine condition.
- 1—20" Henry & Wright Ball Bearing Drill.
- 1—No. 5C Binsse Horizontal Boring and Milling Machine, $3\frac{1}{4}$ " bar.
- 1—No. 3B Binsse Horizontal Boring and Milling Machine, $2\frac{1}{2}$ " bar.
- 1—24" Automatic Gear Cutter, spurs and bevels, manufactured by Becker-Brainard Co.
- 1—10-Ton Case Traveling Crane, 220 v., d. c., 56' span, 3 motors.
- 1—Automatic Coiled Wire Spring Forming Machine.
- 1—400 to 1200-Ton Forming Press, wt. 175,000 lbs., 28" stroke, motor driven, $14\frac{1}{2}$ " dia. shaft.
- 1—500 H. P. Green Corliss Engine.
- 1—48"x48"x16' Ridgeway Planer, 4 heads, 4 years old, A1 condition.
- 1—42"x42"x26' Woodward-Powell Planer, 4 heads, used 3 months.

All of the above machines are in good condition and need no overhauling. If we do not list the machine you want, advise us and we will locate it for you.

D. M. Osborne Machinery Co.

Suite 917 American Trust Bldg.

Cleveland, Ohio



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Continuous Electric.
Sells at **half the price.** Uses **half the current** of others. Perfect prints up to 48" in width and of unlimited length.

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FOR SALE A Machine Tool Manufacturing Business

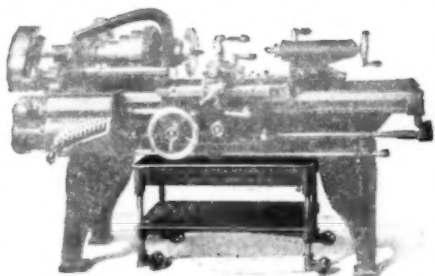
This is an established line of machine tools, but we have enough work in another line to keep our plant profitably employed, and are now months behind in our work. We cannot take care of both lines.

For particulars write to

Manufacturer

Care A. H. Hitchcock, 1220 Caxton Building., Chicago, Ill.

The "New Britain" Portable Lathe Pan



The cast-iron lathe pan has been made necessary by the much greater chip-producing ability of the modern lathe. Wooden troughs and sheet-iron makeshifts no longer suffice.

The "New Britain" Lathe Pan, which is made in many sizes, cannot buckle or break under any possible load. It is handsome in design, matching the lines of the lathe, and an occasional coat of paint keeps it like new.

Ball-bearing casters, that face instantly in any direction, make it easy to move about, which is always desirable, but doubly so in cramped quarters. Provision is made for drawing off and saving the oil.

Write for the circular

The New Britain Machine Co.

Shop Furniture Originators

60 Chestnut St., New Britain, Conn.

